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JOURNAL INFORMATION

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The principal function of Catesbeiana is to publish observations and original research about Virginia herpetology. Rarely will articles be reprinted in Catesbeiana after they have been published elsewhere. All correspondence relative to the suitability of manuscripts or other editorial matters should be directed to: Dr. Paul Sattler, Co-Editor, Catesbeiana, Biology/Chemistry Department, Liberty University, MSC Box 710155, 1971 University Blvd., Lynchburg, VA 24515, (email: psattler@liberty.edu).

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Manuscripts for consideration of publication in Catesbeiana should be submitted to the Co-Editors electronically. Consult the style of articles in this issue for additional information, including the appropriate format for literature citations. The metric system should be used for reporting all types of measurement data. Email attachments in Word format is desired for all papers. Submissions concerning the herpetofauna of selected areas, such as a park, city or county, should be prepared in article rather than field note format. Articles will be refereed by the editor and one or more qualified reviewers. All changes must be approved by the author before publication; therefore, manuscripts must be received by the editor before March 1 and August 1 to be considered for publication in the spring and fall issues, respectively, of Catesbeiana. Reprints of articles are not available, but authors may reprint their own articles to meet professional needs.

(Editorial policy continued on inside back cover)

Cover Photo: Mabee's Salamander from Newport News Park Survey.

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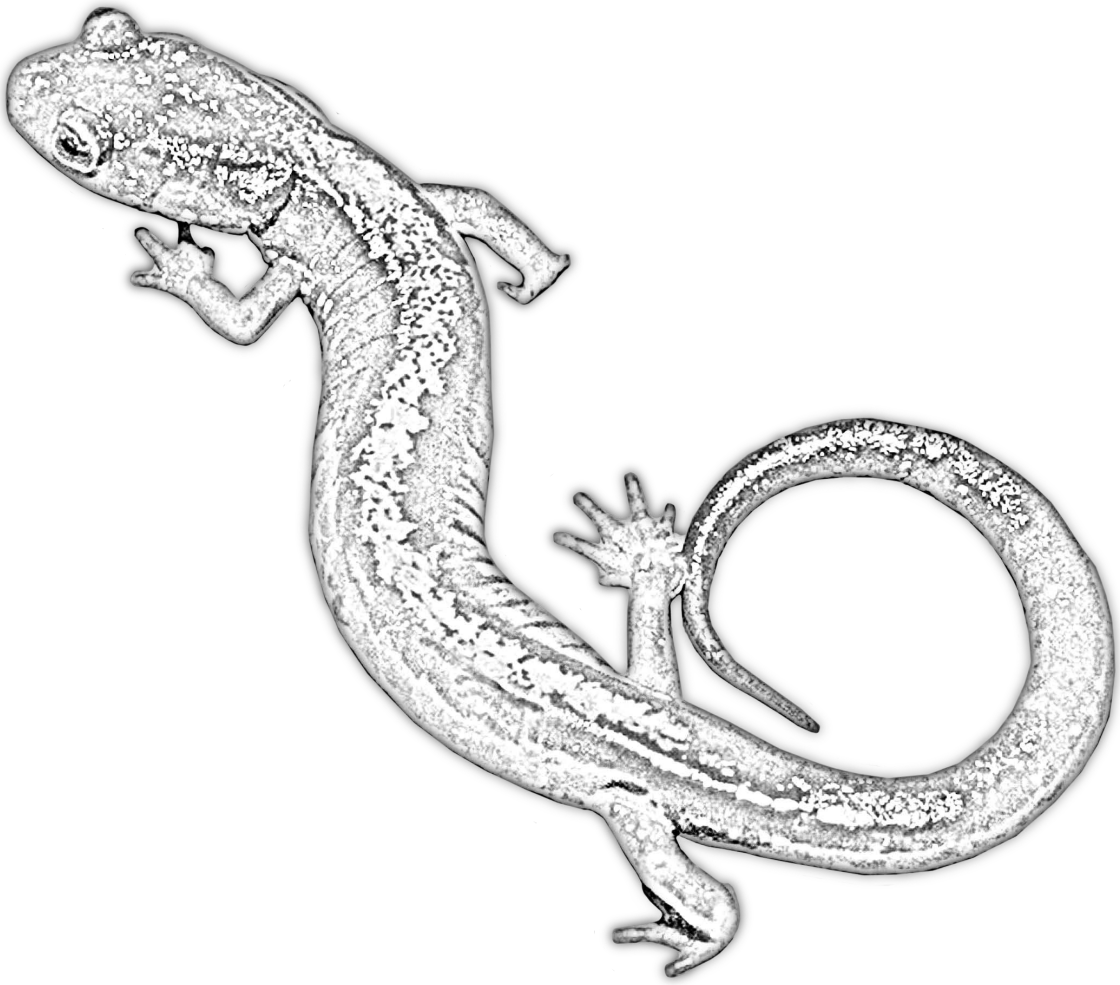
Contents

Catesbeiana 40(1)



John White: Shenandoah Salamander

Herpetological Survey of Amelia Wildlife Management Area 28 April and 5 May 2019

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Abstract: On 28 April and 5 May 2019 the Virginia Herpetological Society conducted a herpetological field survey of several diverse habitats located in Amelia Wildlife Management Area (AWMA) in Amelia County, Virginia to identify amphibian and reptile species within AWMA. This report provides the Virginia Department of Game and Inland Fisheries (VDGIF) with an inventory of amphibian and reptile species for AWMA. Fourteen amphibian (12 anuran and 2 salamander) and twelve reptile (7 snake, 4 turtle and 1 lizard) species were positively identified. Noteworthy species included *Scaphiopus holbrookii* (Eastern Spadefoot), *Heterodon platirhinos* (Eastern Hog-nosed Snake) and *Terrapene c. carolina* (Woodland Box Turtle). The defensive display by the adult *Heterodon platirhinos* included open mouth strikes from a raised head cobra-like posture.

Key words: Amelia Wildlife Management Area, Amelia County, Herpetological field survey, *Heterodon platirhinos, Scaphiopus holbrookii, Terrapene c. carolina*

INTRODUCTION

AWMA is located in Amelia County approximately 40 km (25 miles) southwest of Richmond, VA and 16 km (10 miles) north of Amelia Courthouse. It is bounded on the north and east by the Appomattox River. AWMA was previously used for farming and contains 897 hectares (2,217 acres) of gently rolling terrain with elevations ranging from 61 to 91 meters (200 to 300 feet). Open fields and mixed and mature upland hardwood and pine forests are the primary habitats but there are also 71 hectares (175 acres) of bottomland and beaver swampland along the Appomattox River. There are two man-made lakes in AWMA, 40.5 hectare (100 acre) Amelia Lake and 1.8 hectare (4.5 acre) Saunders Pond. These lakes provide fishing and boating opportunities for the public.

The Conservation Committee of the Virginia Herpetological Society (VHS) selected AWMA for a herpetological survey as AWMA contains some very interesting habitats for a variety of amphibian and reptile species and has not been previously surveyed by the VHS. In addition, nine species with VDGIF conservation status Tier III and Tier IV have previously been documented in Amelia County and some of these species might inhabit AWMA. A VHS survey will also provide VDGIF with an inventory of amphibian and reptile species located there. Two survey dates were selected, Sunday 28 April and Sunday 5 May 2019. A total of 18 volunteers participated in the survey on 28 April and 8 volunteers participated on 5 May.

Survey Sites

The following is a general description of the survey zones. GPS coordinates were obtained via Google satellite maps at the approximate zone location contained in Figure 1.

Site-1 – Amelia Lake East (N37.459886, W-77.920431) is located on the east side of

Amelia Lake to State Route 652. It is bordered on the north by the approach road to the boat ramp and is bordered on the south by the AWMA boundary. Habitat includes the lake shore with mixed hardwood and pine forest, with many downed trees and brier patches, bordering large grassy meadows. This site was surveyed on 5 May.

Site-2 – Amelia Lake West (N37.460602, W-77.929486) is the area west of Amelia Lake to the western AWMA boundary. Site-2 is bordered on the south by the AWMA boundary and includes the creeks feeding Amelia Lake. The northern boundary is the southern portion of the loop trail near the northern tip of Amelia Lake. Site-2 contains thick mixed hardwood forest, creeks, marshy areas and the western shoreline of Amelia Lake. Six minnow traps were placed in the creeks feeding Amelia Lake in the afternoon of 27 April and Site -2 was surveyed on 28 April.

Site-3 – Amelia Lake North (N37.472115, W-77.913415) is the area north of Amelia Lake dam and Marsh Point Trail. It is bordered on the east and north by the Appomattox River and the boundary of AWMA to the west. Habitat includes mixed hardwoods, a shooting range, the northern shoreline of Amelia Lake, marshes and wet areas north of Amelia Lake dam. Site-3 was surveyed on 5 May.

Site-4 – Saunders Pond South (N37. 454333, W-77. 904337) is the area south of Saunders pond from Rote 652 to the west, the Appomattox River to the east, and borders the AWMA boundary to the south. Habitat includes mixed hardwood and pine forest, some thick brier patches, creeks, a drained beaver pond, some AWMA facilities, collapsed buildings and the Appomattox River banks. Site-4 was surveyed on 28 April.

Site-5 – Saunders Pond North (N37. 463838, W-77.903007) is the area north of Saunders Pond and the creek that flows from Saunders Pond to the Appomattox River. Site-5 is bordered on the north by Marsh Point Trail, on the east by the Appomattox River, and on the west by State Route 652. Habitat includes mixed hardwood and pine forests, a creek, and a drained former beaver pond. Three minnow traps and one baited turtle trap were placed near the north shore of Saunders Pond on the afternoon of 27 April and Site-5 was surveyed on 28 April.

MATERIALS AND METHODS

Eighteen volunteers participated in the survey for approximately 5 hours (from 09:30 to 14:30h) in the field on 28 April and 4 volunteers remained for an additional 1.5 hours to retrieve minnow and turtle traps. Eight volunteers participated for approximately 2.5 hours (from 09:00 to 11:30h) in the field on 5 May while 6 volunteers remained for 2 additional hours (from 12:30 to 14:30h) for a net survey total of about 130.5 person hours (Tables 1 and 2). Due to the number of participants, 2 survey groups were organized to survey 3 sites within AWMA on 28 April. Weather conditions were sunny and skies were clear, with temperatures ranging from 16^{o} to 26^{o} C. One survey group was organized to survey 2 sites on 5 May. Weather conditions included periods of heavy rain, light rain and dry periods with overcast skies. Temperatures ranged from 18^{o} to 23^{o} C.

Prior to each survey, all participant footwear and survey gear (snake hooks, field sticks, dip nets etc.) were disinfected using Nolvasan® Solution (chlorhexidine diacetate). Survey participants on both survey days used multiple collecting methods to find amphibians and reptiles, including visual observation, listening for calling anurans, hand capture and over-turning objects with snake hooks and field sticks. All

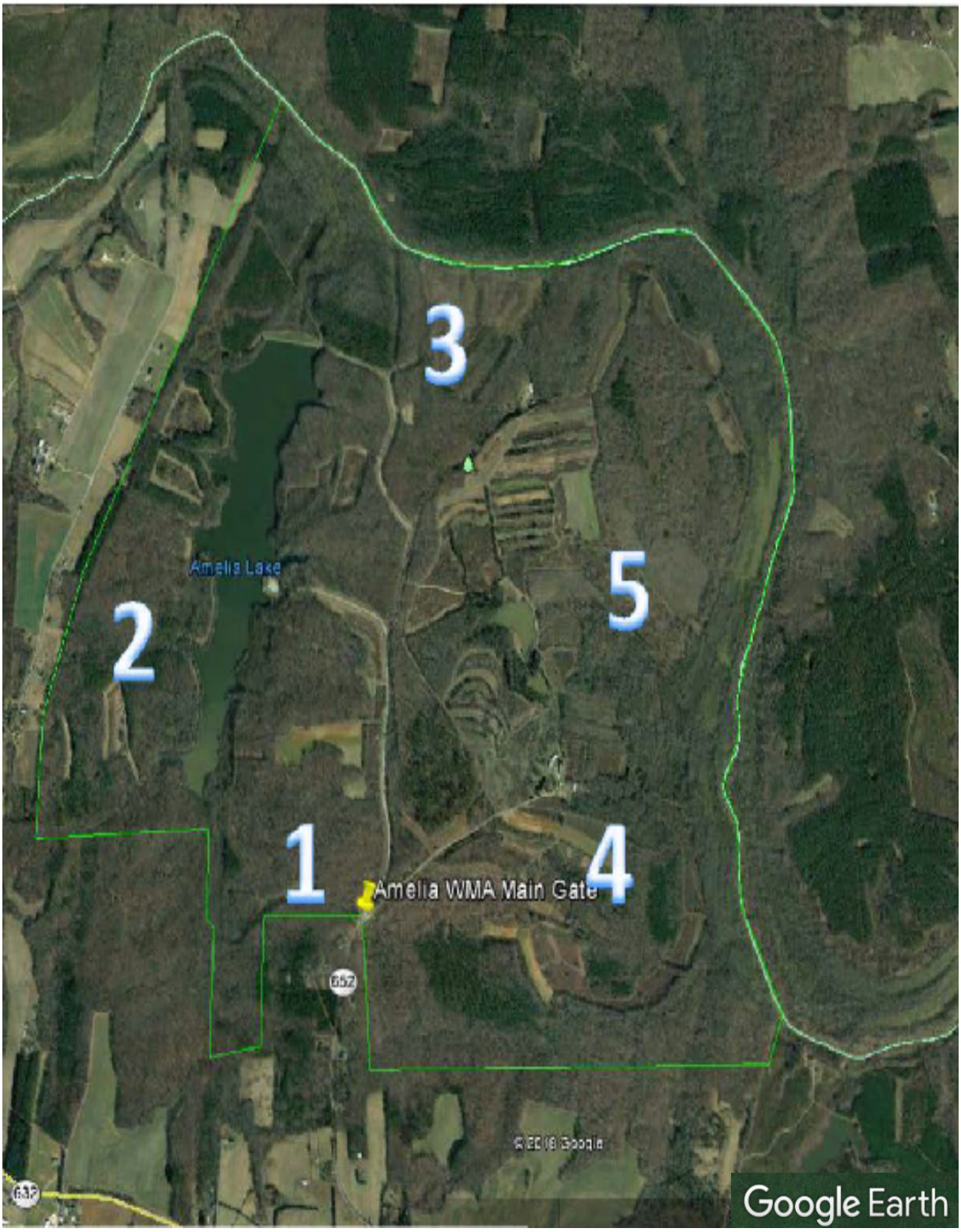

Figure 1. Map of AWMA showing the survey sites.

captured animals were observed to identify possible malformations, injuries or disease, other unique markings and characteristics, and were released at the location of capture. Digital photos were taken of some of the captured animals prior to their release. Survey group leaders summarized and submitted all relevant data on VHS survey group data sheets. The following tables summarize the survey effort.

Table 1. Summary of the survey effort on 28 April 2019

Survey Site	No. of Surveyors	Hours	Estimated Person Hours
2-Amelia Lake West	10	5	**50**
2-Trap retrieval	4	1	**4**
4-Saunders Pond South	8	4	**32**
5-Saunders Pond North	7	1.5	**10.5**
5-Trap retrieval	4	0.5	**2**
Total			**98.5**

Table 2. Summary of the survey effort on 5 May 2019

Survey Site	No. of Surveyors	Hours	Estimated Person Hours
1-Amelia Lake East	6	2	**12**
3-Amelia Lake North	8	2.5	**20**
Total			**32**

RESULTS

During the two-day survey, a total of 26 species were captured or positively identified, including 14 amphibians and 12 reptiles (Table 3). The survey produced a total of 12 anuran, 2 salamander, 7 snake, 4 turtle and 1 lizard species. More than 147 animals were captured or positively identified.

Table 3. Survey Results.

Site	1 Amelia Lake East	2 Amelia Lake West	3 Amelia Lake North	4 Saunders Pond South	5 Saunders Pond North	Total
Class Amphibia						
Anuran Species						
Acris crepitans	4	8	1	10		**23**
Anaxyrus a. americanus			1			**1**
Anaxyrus fowleri		1			2	**3**
Anaxyrus tadpoles				>60		**>60**
Hyla chrysoscelis				2 CM	2 CM	**4**

Hyla cinerea			1 CM			**1**
Hyla squirella			1 CM			**1**
Lithobates catesbeianus		4 CM	1 CM			**5**
Lithobates clamitans		1	2 CM		1+1 CM	**5**
Lithobates palustris		1				**1**
Lithobates sphenocephalus utricularius				2		**2**
Pseudacris crucifer	1					**1**
Scaphiopus holbrookii			1 CM			**1**
Total Anurans	**5**	**15**	**8**	**>74**	**6**	**>108**
Salamander species						
Desmognathus fuscus				3		**3**
Notophthalmus v. viridescens		2	1			**3**
Total Salamanders	**0**	**2**	**1**	**3**	**0**	**6**
Total Amphibians	**5**	**17**	**9**	**>77**	**6**	**>114**
Class Reptilia						
Snake Species						
Carphophis a. amoenus	1	2	5			**8**
Coluber c. constrictor		3		2		**5**
Heterodon platirhinos		1				**1**
Opheodrys aestivus		1				**1**
Pantherophis alleghaniensis			1	3		**4**
Thamnophis s. sirtalis					1	**1**
Virginia v. valeriae			1			**1**
Total Snakes	**1**	**7**	**7**	**5**	**1**	**21**
Turtle species						
Chelydra serpentina			2			**2**
Chrysemys p. picta		1			1	**2**
Kinosternon s. subrubrum					1	**1**
Terrapene c. carolina	1	1		1		**3**
Total Turtles	**1**	**2**	**2**	1	**2**	**8**
Lizard Species						
Plestiodon fasciatus/unconfirmed		2		2		**4**
Total Lizards	**0**	**2**	**0**	**2**	**0**	**4**
Total Reptiles	**2**	**11**	**9**	**8**	**3**	**33**
Total Amphibians & Reptiles	**7**	**28**	**18**	**>85**	**9**	**>147**

CM = Calling Males

ANNOTATED CHECKLIST

Amphibians

1. *Acris crepitans* (Eastern Cricket Frog) Eight adult Eastern Cricket Frogs were observed within Site 2 at the edge of a stream in hardwood forest and ten adult Eastern Cricket Frogs were observed within Site 4 in fields and a creek on 28 April. Several of the specimens from Site 4 were captured and appeared to be healthy. One adult Eastern Cricket Frog was captured within Site 3 on the forest floor and appeared to be healthy and four juvenile Eastern Cricket Frogs were observed hopping on a trail and in the woods within Site 1 on 5 May. All captured specimens were released at the place of capture.

2. *Anaxyrus a. americanus* (American Toad) One adult American Toad was captured within Site 3 on the forest floor on 5 May. This specimen was photographed prior to release and appeared to be healthy.

3. *Anaxyrus fowleri* (Fowler's Toad) One adult Fowler's Toad was captured alongside a stream in a forest area within Site 2 and two adult Fowler's Toads were captured next to a stump and within a briar patch in a cutover area within Site-5 on 28 April. All these specimens were photographed prior to release and appeared to be healthy.

4. *Anaxyrus sp.* tadpoles More than sixty *Anaxyrus sp.* tadpoles were observed at two locations within Site 4 on 28 April. At least ten were observed in a slow moving stream and more than fifty were in a large mud puddle. It could not be visually determined whether they were *A. a. americanus* or *A. fowleri* because their mating seasons overlap.

5. *Desmognathus fuscus* (Northern Dusky Salamander) Three juvenile Northern Dusky Salamanders were observed in a stream within Site 4 on 28 April. One of these juvenile salamanders was captured, photographed prior to release and appeared to be healthy.

6. *Hyla chrysoscelis* (Cope's Gray Treefrog) Two adult male Cope's Gray Treefrogs could be heard calling from a wooded area near the Appomattox River within Site 4 and two adult male Cope's Gray Treefrogs could be heard calling, one from a wooded area and another near Saunders Pond, within Site 5 on 28 April.

7. *Hyla cinerea* (Green Treefrog) One adult male Green Treefrog could be heard calling from a muddy and leafy wet area in woods within Site 3 on 5 May.

8. *Hyla squirella* (Squirrel Treefrog) One adult Squirrel Treefrog could be heard calling from high in the canopy in a wet wooded area within Site 3 on 5 May.

9. *Lithobates catesbeianus* (American Bullfrog) Four adult male American Bullfrogs could be heard calling from the vicinity of Amelia Lake within Site 2 on 28 April and one adult male American Bullfrog could be heard calling from Amelia Lake on 5 May.

10. *Lithobates clamitans* (Green Frog) One Green Frog Tadpole was retrieved from one of the minnow traps placed in the westernmost feed stream to Amelia Lake within Site 2. One Green Frog tadpole was retrieved from a minnow trap placed in and one adult male green frog could be heard calling from Saunders Pond within Site 5. These three observations occurred on 28 April. Two adult male Green Frogs could be heard calling from a swampy area north of Amelia Lake on 5 May.

11. *Lithobates palustris* (Pickerel Frog) One adult Pickerel Frog was captured from under a rock within a stream within Site 2 on 28 April. This specimen was photographed prior to release and appeared to be healthy.

12. *Lithobates sphenocephalus utricularius* (Coastal Plains Leopard Frog) One adult Coastal Plains Leopard Frog was observed in a temporary ephemeral pool but could not be captured but a second adult Coastal Plains Leopard Frog was captured in a stream within Site 4 on 28 April. The captured specimen appeared to be healthy and was released at the point of capture.

13. *Notophthalmus v. viridescens* (Red-spotted Newt) Two adult aquatic phase Red-spotted Newts were captured from under streamside logs within Site 2. These specimens were photographed prior to release and appeared to be healthy. One terrestrial eft stage Red-spotted Newt was captured on the forest floor within Site 3 on 5 May. This specimen was photographed prior to release and appeared to be healthy.

14. *Pseudacris crucifer* (Spring Peeper) One adult Spring Peeper was observed hopping on a trail within Site 1 on 5 May.

15. *Scaphiopus holbrookii* (Eastern Spadefoot) One adult male Eastern Spadefoot could be heard calling from a wet wooded area within Site 3 on 5 May.

Reptiles

16. *Carphophis a. amoenus* (Eastern Wormsnake) Two juvenile Eastern Wormsnakes were captured within Site 2 on 28 April. One was under bark and the other in a log alongside the trail. Both were photographed prior to release and appeared to be healthy. Five juvenile Eastern Wormsnakes were captured under logs in the forest within Site 3 and one adult Eastern Wormsnake was captured under bark near the trail within Site 1 on 5 May. All the captured specimens appeared to be healthy and the adult specimen was photographed prior to release.

17. *Chelydra serpentina* (Snapping Turtle) Two adult Snapping Turtles were observed in the water of a small inlet off the north end of Amelia Lake within Site 3 on 5 May.

18. *Chrysemys p. picta* (Eastern Painted Turtle) One adult Eastern Painted Turtle was observed basking on a log in the easternmost feed stream to Amelia Lake within Site 2 while minnow traps were being placed late in the afternoon of 27 April. One adult female Eastern Painted Turtle was retrieved and released on 28 April from the turtle trap placed in Saunders Pond. This specimen had a large leech on its plastron.

19. *Coluber c. constrictor* (Northern Black Racer) Three adult Northern Black Racers were captured at the edge of a field backing up to forest comprised of tulip, maple and oak hardwoods within Site 2 and two adult Northern Black Racers were observed together, possibly mating, but escaped capture by fleeing into a large briar patch within Site 4 on 28 April. At least one of the captured Site 2 specimens was photographed prior to release and all the captured snakes appeared to be healthy.

20. *Heterodon platirhinos* (Eastern Hog-nosed Snake) One black adult Eastern Hog-nosed Snake was encountered at the edge of a trail, in a wood pile between two streams within Site 2 on 28 April. Attempts to capture this specimen resulted in a defensive display that included cobra-like swaying and several open mouth strike attempts. This defensive behavior was photographed.

Figure 2. *Heterodon platirhinos.*

21. *Kinosternon s. subrubrum* (Southeastern Mud Turtle) One adult Southeastern Mud Turtle was captured in an open muddy area by a large hardwood tree within Site 5 on 28 April. This specimen appeared to be healthy and was photographed prior to release.

22. *Opheodrys aestivus* (Northern Rough Greensnake) One adult Northern Green Snake was captured hanging from branches near the trail in an upland hardwood forest area within Site 2 on 28 April. This specimen was photographed prior to release and appeared to be healthy.

Figure 3. *Opheodrys aestivus*.

23. *Pantherophis alleghaniensis* (Eastern Ratsnake) One adult Eastern Ratsnake was observed and photographed coiled in a hardwood tree cavity and two adult Eastern Ratsnakes were captured, one from within a stream and the other while basking on the ground within Site 4 on 28 April. One adult Eastern Ratsnake was captured while crossing the road within Site 3 on 5 May. All of the captured specimens were photographed prior to release and appeared to be healthy.

24. *Plestiodon fasciatus/unconfirmed* (Common Five-lined Skink) Two juvenile Common Five-lined Skinks were captured, one under bark and the other in a log, next to the trail within Site 2. The captured individuals were photographed prior to release. Two adult *Plestiodon* skinks were observed basking on a collapsed shed within Site 4 but escaped prior to capture and could not be positively identified. All these observations occurred on 28 April.

25. *Terrapene c. carolina* (Woodland Box Turtle) One male adult Woodland Box Turtle was captured next to a log in a hardwood upland area within Site 2 and one adult male Woodland Box Turtle was captured on the ground in a wet grassy area near the Appomattox River within Site 4 on 28 April. One female adult Woodland Box Turtle was captured on the ground in a grassy area within Site 1 on 5 May. Each of the three observed specimens were photographed prior to release and appeared to be healthy.

26. *Thamnophis s. sirtalis* (Eastern Gartersnake) An adult Eastern Gartersnake was observed swimming in a clear stream from bank to bank but could not be captured and disappeared under the far bank within Site 5 on 28 April.

27. *Virginia v. valeriae* (Smooth Earthsnake) An adult Smooth Earthsnake was captured under a log within Site 3 on 5 May. This specimen was photographed prior to release and appeared to be healthy.


Figure 4. *Virginia valeriae*.

DISCUSSION

During the two-day survey of "AWMA", the VHS survey groups positively identified more than 147 specimens representing twenty-six species (Table 3). There were 14 species of amphibians (12 frogs and 2 salamanders) and 12 species of reptiles (7 snakes, 4 turtles and 1 lizard). More than 60 *Anaxyrus sp.* tadpoles observed in two locations within Site 4 could be either *A. a. americanus* or *A. fowleri.* Three of the anuran species heard calling, *Hyla squirella* (Squirrel Treefrog)*, Lithobates catesbeianus* (American Bullfrog) and *Scaphiopus holbrookii* (Eastern Spadefoot) have not been previously documented in Amelia County. However, audio recordings of the calling males of these species were not made. These species remain undocumented for Amelia County. Anuran species were the most frequently encountered animals during the survey with more than 108 observations. However, most of the observed animals (>60) were tadpoles.

Some of the common amphibian and reptile species previously documented for Amelia County but not observed during the survey include *Diadophis punctatus edwardsii* (Northern Ring-necked Snake), *Eurycea cirrigera* (Southern Two-lined Salamander), *Nerodia s. sipedon* (Northern Watersnake), *Plethodon cylindraceus* (White-spotted Slimy Salamander), *Sceloporus undulates* (Eastern Fence Lizard), *Sternotherus odoratus* (Eastern Musk Turtle) and *Storeria dekayi* (Dekay's Brownsnake).

There were three species encountered with designated conservation status as defined in "Virginia's 2015 Wildlife Action Plan' published by VDGIF, *Heterodon platihinos* (Eastern Hog-nosed Snake), *Scaphiopus holbrookii* and *Terrapene c. carolina* (Woodland Box Turtle). *Heterodon platirhinos* and *Scaphiopus holbrookii* have a conservation status of Tier IVc, which is moderate conservation need but without a defined action plan to benefit the species or its habitat. *T. c. carolina* has a conservation status of Tier IIIa, which is high conservation need but with an identified action plan that has a reasonable chance of improving the species conservation status. *T. c. carolina* benefits from the maintenance of open canopied woodlands and meadows with areas of dense groundcover.

Seven other species with a VDGIF conservation status of Tier III-IV, which had been previously documented for Amelia County, were not observed during the survey. These are *Cemophora coccinea copei* (Northern Scarlet Snake), *Clemmys guttata* (Spotted Turtle), *Farancia a. abacura* (Eastern Mudsnake), *Ophisaurus attenuatus longicaudus* (Eastern Slender Glass Lizard), *Pseudotriton m. montanus* (Eastern Mud Salamander), *Siren lacertian* (Greater Siren) and *Thamnophis s. sauritus* (Common Ribbonsnake).

The International Union for the Conservation of Nature and Natural Resources ("IUCN") publishes the "IUCN Red List of Threatened Species". The conservation status of *Heterodon platirhinos, Scaphiopus*

holbrookii and *T. carolina* have been evaluated by the IUCN Red List of Threatened Species across the known historic range for each species. Hammerson (2007) rated *Heterodon platirhinos* as a threatened species of least concern in view of its wide distribution, presumed large population and because it is not likely to be declining fast enough to qualify for a listing in a more threatened category. The IUCN SSC Amphibian Specialist Group (2015) evaluated *Scaphiopus holbrookii* as a threatened species of least concern in view of its wide distribution and presumed large population. However, van Dyk (2011) evaluated the six subspecies of *T. carolina* including *T.c.carolina* as a threatened species that are vulnerable due to a widespread and permanent gradual population decline which probably exceeds 30% over three generations, conservatively considered as 50 years. A variety of factors are cited as possible explanations for the decline of *T.carolina* including habitat destruction, pollution, pesticide effects, collecting for the pet trade, and vehicle strikes among others.

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Herpetological Survey of Appomattox-Buckingham State Forest and Holliday Lake State Park 21 September, 2019

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Abstract: A herpetological survey of Appomattox-Buckingham State Forest and Holliday Lake State Park took place on 21 September, 2019. This was the second year in a row for the fall survey hosted by the Virginia Herpetological Society due to the large area of the state forest. The area has mainly been used for farmland and timber harvest and includes a variety of upland and bottomland vegetation as well as freshwater features. During this survey, different areas of the park were surveyed by two teams. A total of 122 specimens representing 26 species were observed, including 16 species of amphibians (nine frogs and seven salamanders) and ten species of reptiles (six snakes, three turtles and one lizard). In the future, the VHS plans to survey additional areas of both HLSP in Appomattox County and ABSF in both Appomattox and Buckingham counties. It is recommended that at least one future survey take place during the spring-summer activity season (February-June).

Keywords: Appomattox-Buckingham State Forest, Holliday Lake State Park, survey

INTRODUCTION

Appomattox-Buckingham State Forest (ABSF) is located in both Appomattox and Buckingham Counties. Holliday Lake State Park (HLSP) is located in Appomattox County, nested within ABSF. ABSF was originally comprised of mainly farmland, but by the 1930s the land had become unproductive and eroded. The federal government began purchasing tracts of land at that time under the Bankhead-Jones Farm Tenant Act, which was enacted to help conserve and restore the land. In 1954, the land was deeded to the Commonwealth and grew to 8,000 hectares (19,808 acres) through further land acquisition. Today, the ABSF is managed and used as a source of sustainable timber harvest and wildlife habitat. Recreational activities include hiking, horseback riding, and fishing/hunting. The forest includes a variety of habitats including creeks, streams, seeps, vernal pools, upland forest, and open meadows.

HLSP is nested within ABSF on the Appomattox County side of Holliday Creek. The park includes Holiday Lake and a variety of short distance trails, as well as recreational camping, swimming, and fishing. The forest includes a variety of habitats including creeks, streams, seeps, vernal pools, upland forest, and open meadows.

These properties are of interest to the VHS Conservation Committee because few official surveys have been conducted in the area, as exemplified by the current list of species observations for both Appomattox and Buckingham Counties. Due to the paucity of survey data from the area and the

variety of habitats, there is potential for several county records and interesting finds. Due to the large area to be surveyed, a similar survey was conducted in 2018 in different areas of the parks. The results of that survey can be found in a previous volume of this journal (Anthony, 2019).

Survey Sites

The following is a general description of the survey areas. Coordinates were specific GPS coordinates provided by the group leaders at the survey starting point.

Site-1: 4H Camp and Southwest (37.3899692, N,-78.6425311 W) starts at the 4H camp that is located just west of HLSP. The dominant habitats around the 4H camp include man-made buildings, a small

wetland, creeks and seepages, and upland secondary growth forests dominated mainly by pines (mainly jack pine) and a few broad-leaf trees (red maple, oak, hickory, sycamore, beech) and understory plants (a few species of ferns, occasional orchids, Jack-in-the-pulpits, mosses).

Site-2: Holiday Creek, North and South of Richmond Forest Road (37.433502, N, -78.686711 W) is located within both Appomattox and Buckingham Counties. The area surveyed followed Holiday Creek north of Richmond Forest Road and south until Rinehart Forest Road. The main habitats found along this area include bottom forests and a mostly dry creek bed with some areas of water with trees and shrubs such as sycamore, red maple, beech, hickory and mountain laurel; herbaceous plants such as jewelweed, spicebush, Christmas fern, cinnamon fern, and club moss.

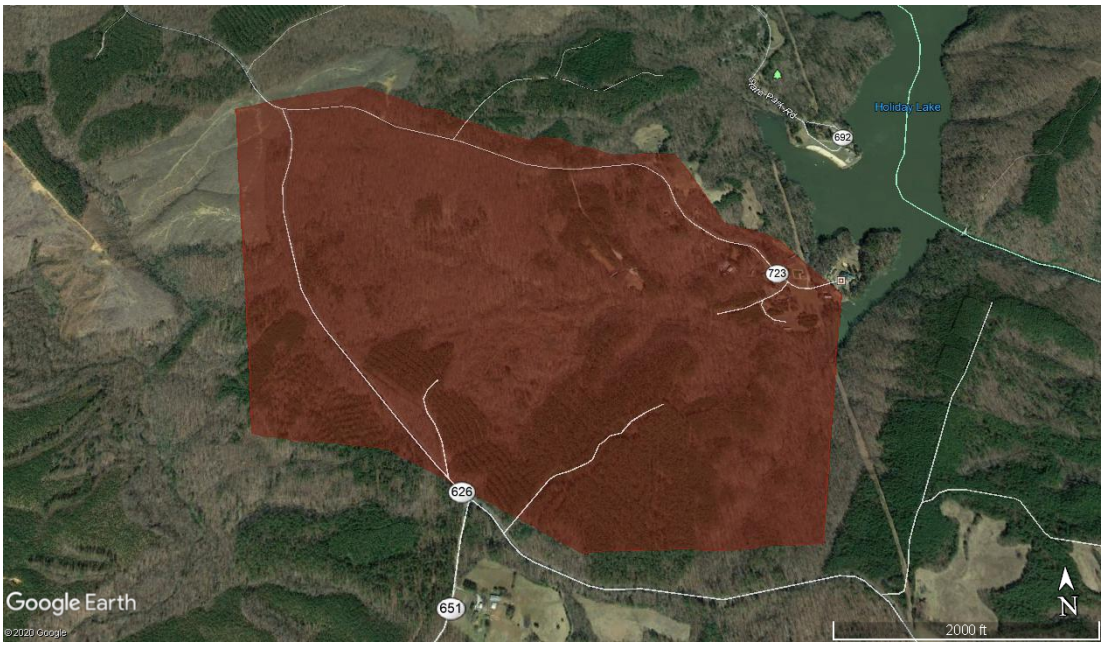

Figure 1. Map showing the survey area within Site-1.

Figure 2. Map showing survey area within Site-2.

MATERIALS AND METHODS

Eighteen volunteers participated in the survey for approximately six hours (from 09:00 to 15:30h, lunch break for 30 minutes) in the field on 21 September for a net survey total of 108 person hours (Table 1). Two survey groups were organized to survey two sites (Sites-1 and 2 as described above). Weather conditions were mostly sunny skies in the morning and partly cloudy with sun in the afternoon. Temperatures started at about 20 degrees C and went up to about 30 degrees C by the conclusion of the survey.

Prior to the survey, all participant footwear and survey gear (snake hooks, field sticks, dip nets etc.) were disinfected using a 10% bleach solution with water. Survey participants used multiple collecting methods to find amphibians and reptiles, including visual observation, listening for calling anurans, hand capture, over-turning objects with snake hooks and field sticks, and three turtle traps were set before the survey started and checked at the end of the survey. All captured animals were observed to identify possible malformations, injuries or disease and other unique markings and characteristics. Digital photos were taken of many of the captured animals prior to their release at the site of capture. Survey group leaders summarized and submitted all relevant data on VHS survey group data sheets.

RESULTS

A total of 26 species were captured or positively identified, including 16 amphibians and 10 reptiles (Table 2). The survey produced a total of nine frog, seven salamander, six snake, three turtle, and one lizard species. One hundred twenty-two individual animals were captured or observed and positively identified.

Table 1. Summary of the survey effort.

Survey Area	No. of Surveyors	Hours	Estimated Person Hours
Site-1: 4H Camp and Southwest	5	6	**30**
Site-2: Holiday Creek, North and South of Richmond Forest Road	13	6	**78**
Total			**108**

Table 2. Survey Results

Species/County	Appomattox	Buckingham	Total
Class Amphibia			
Frog Species			
Acris crepitans	14	0	**14**
Anaxyrus americanus americanus	1	0	**1**
Anaxyrus fowleri	2	0	**2**
Hyla chrysoscelis/Hyla versicolor	0	2	**2**
Lithobates catesbeianus	0	2	**2**
Lithobates clamitans	7	6	**13**
Lithobates palustris	1	3	**4**
Lithobates sylvaticus	6	3	**9**
Pseudacris crucifer	2	0	**2**
Total Anurans			**49**
Salamander species			
Ambystoma opacum	1	0	**1**
Desmognathus fuscus	2	3	**5**
Eurycea cirrigera	22	10	**32**
Eurycea guttolineata	7	0	**7**
Notophthalmus v. viridescens	11	0	**11**
Plethodon cylindraceus	1	0	**1**
Pseudotriton ruber ruber	2	0	**2**
Total Salamanders			**59**
Total Amphibians			**108**
Class Reptilia			
Snake Species			
Carphophis amoenus amoenus	1	0	**1**
Coluber c. constrictor	1	0	**1**

Diadophis punctatus edwardsii	1	0	**1**
Nerodia sipedon sipedon	1	1	**2**
Opheodrys aestivus	1	0	**1**
Storeria occipitomaculata	1	0	**1**
Total Snakes			**7**
Turtle species			
Chelydra serpentina	1	0	**1**
Chrysemys picta	1	0	**1**
Terrapene c. carolina	2	2	**4**
Total Turtles			**6**
Lizard Species			
Sceloporus undulatus	1	0	**1**
Total Lizards			**1**
Total Reptiles			**14**

Annotated Checklist

Amphibians

1. *Acris crepitans* (Cricket Frog) Fourteen were observed about 100 m west of the 4H camp near a wetland and creek in Site-2.

2. *Anaxyrus americanus americanus* (Eastern American Toad) One was observed in an upland forest near a dry creek bed in Site-2.

3. *Anaxyrus fowleri* (Fowler's Toad) One individual was observed floating in the pool (alive) at the 4H camp in Site-2, and one was observed near a creek in Site-2.

4. Hyla chrysoscelis/versicolor (Gray Treefrog Complex) Two tadpoles were observed in a shallow pool in a forest in Site-2. No gray treefrog calls were heard to differentiate the species.

5. *Lithobates catesbeianus* (Bullfrog) One individual was observed near a creek under a log in Site-2, and one was found dead in the forest in Site-2.

6. *Lithobates clamitans* (Greenfrog) In Site-2, one adult was found in a forest, several tadpoles were found in an oxbow pool, and one juvenile/metamorph was found on the forest floor. In Site-2, several tadpoles were found in an oxbow pool, and one adult was found on the forest floor. None were observed in Site-1.

7. *Lithobates palustris* (Pickerel Frog) One individual was observed near a creek in Site-2, and three were observed near a creek in a side pool.

8. *Lithobates sylvaticus* (Wood Frog) In Site-1, one individual was observed in a forest. In Site-2, four adults were observed near a creek and one juvenile was observed in a floodplain of a creek. In Site-2, one adult was found on the bank of a creek.

9. *Pseudacris crucifer* (Spring Peeper) In Site-1, one adult was observed in an lowland forest near a dry creek bed. In Site-2, one adult male was heard calling in the forest.

10. *Ambystoma opacum* (Marbled Salamander) In Site-2, one adult female was found guarding eggs under a log near a dry creek.

11. *Desmognathus fuscus* (Northern Dusky Salamander)

12. *Eurycea cirrigera* (Southern Two-Lined Salamander) In Site-1, five adults were observed in a bottomland forest. In Site-2, five larvae and 12 adults were found under rocks near a stream and 10 adults were found under rocks near another stream.

13. *Eurycea guttolineata* (Three-lined Salamander) In Site-1, three adults were observed under rocks in a stream. In Site-2, four adults were found under rocks near a stream.

14. *Notophthalmus viridescens* (Eastern Newt) In Site-1, 11 juveniles (red efts) were found under rocks and logs and traveling in the open along the forest floor near a trail that ran near a creek and not far from a wetland.

15. *Plethodon cylindraceus* (White-spotted Slimy Salamander) In Site-1, one adult was found under a log in a forest.

16. *Pseudotriton ruber ruber* (Red Salamander) In Site-1, two adults were found under logs in the forest.

Reptiles

17. *Carphophis amoenus amoenus* (Eastern Wormsnake) In Site-2, one adult was found under pine bark in thea forest.

18. *Coluber c. constrictor* (Northern Black Racer) In Site-1, one juvenile was found dead on a paved road, Co. Rt. 723, near the junction with 626.

19. *Diadophis punctatus edwardsii* (Northern Ring-necked Snake) In Site-2, one adult was found in a rotten log.

20. *Nerodia sipedon sipedon* (Northern Watersnake) In Site-2, one juvenile and one adult were found under rocks in a creek.

21. *Opheodrys aestivus* (Rough Green Snake) In Site-2, one individual was found dead in the road near the contact station to HLSP.

22. *Storeria occipitomaculata* (Red-bellied Snake) In Site-1, one adult was found in a rotten log in a pine forest.

23. *Chelydra serpentina* (Snapping Turtle) One adult was observed surfacing Holiday Lake at HLSP.

24. *Chrysemys picta* (Eastern Painted Turtle) One adult male was captured in a turtle trap that was set in a creek near Holliday Lake in HLSP.

25. *Terrapene c. carolina* (Woodland Box Turtle) In Site-1, a shell was found in a forest. In Site-2, one adult male was found on the forest floor, and two shells were found on the forest floor.

26. *Sceloporus undulatus* (Eastern Fence Lizard) One adult was observed on a building near Holliday Lake at HLSP.

DISCUSSION

There was one species, captured and photographed in both areas surveyed, with designated conservation status as defined in "Virginia's 2015 Wildlife Action Plan" published by VDGIF; *Terapene c. carolina* (Woodland Box Turtle), which has a conservation status of *"Tier llla. High*

Conservation Need." The opportunity ranking of **A** indicates "on the ground" species or habitat management strategies have been identified that are expected to benefit this species, at least some of which can be implemented with existing resources at the state forest and state park, and have a reasonable chance of improving the species conservation status. For this species, habitat conservation and restoration are underway in some of its range (open canopy forest and meadows preservation).

More species were observed in survey sites located in Appomattox County than in Buckingham County, and this is likely because most of the area that was surveyed was located in Appomattox County. Only a small portion of ABSF that lies in Buckingham County was surveyed, and more area of that part of ABSF could be surveyed. The survey from the previous year in 2018 (Anthony, 2019) resulted in many of the same species being observed from similar habitats in both ABSF and HLSP. A total of 26 species were captured or positively identified, including 16 amphibians and 10 reptiles. That survey produced a total of nine anuran, seven salamander, four snake, three turtle, and three lizard species. Seventy one individual animals were captured or observed, and positively identified. In Appomattox County there was one county record (*Scincella lateralis*) and in Buckingham County there was one county record (*Virginia valeriae*). No county records were observed from this survey in 2019. In the future, VHS plans to survey additional areas of both HLSP in Appomattox County and ABSF in both Appomattox and Buckingham counties. It is recommended that at least one survey take place during the spring-summer breeding season (February-June).

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Results of the Fourteenth Annual HerpBlitz: Featherfin Wildlife Management Area

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Abstract: The fourteenth annual herpblitz was held on 15-16 June 2019 at Featherfin Wildlife Management Area, Virginia. A total of six species of amphibians (three anurans and three salamanders) and seven species of reptiles (one turtle, two lizards, and four snakes) were observed during the survey time period. This was the first amphibian and reptile biodiversity survey conducted at this WMA and thus serves as a baseline checklist that future surveyors can build upon. After surveying Featherfin we highly recommend WMA managers restore 18 hectares (45 acres) of the original property that were ditched and drained back into viable wetlands. Restoring these wetlands would provide needed habitat to increase the amphibian and reptile biodiversity.

Keywords: Herpetological Survey, Featherfin Wildlife Management Area, Herpblitz, Appomattox, Buckingham, and Prince Edward Counties

INTRODUCTION

The fourteenth annual herpblitz was held on 15-16 June 2019 at Featherfin Wildlife Management Area. This WMA was purchased in October 2005 as one track of land from FGB Farm Inc. It consists of 1,118 hectares (2,763 acres) of mature hardwood forest, stands of planted Loblolly pine, small tracts of shortleaf and Virginia pine, and 16 kilometers (10 miles) of Appomattox River frontage. There are also farmed fields and cutover areas. Throughout the property there are small intermittent and perennial streams and one larger perennial named stream, Cabin Branch Creek. There are small wetland areas throughout the WMA. However, there are no ponds, lakes, or long cycle vernal pools. According to the site management plan, there are about 18 hectares (45 acres) of wetlands that were ditched and drained which could be restored (Featherfin WMA site master plan). The elevation of this property ranges from approximately 100 to 200 m (350 to 630 ft.). The WMA is characteristic of the Piedmont with rolling hills. The land appeared to have features such as gullies that suggests a major impact from long agricultural usage. Featherfin WMA spans three counties including Appomattox, Buckingham, and Prince Edward.

This property was selected for the herpblitz because of the lack of previous survey work in this area. Very little has been done to document the amphibians and reptiles in these three counties as well. Unfortunately, the Virginia Piedmont is under-surveyed due to the lack of endemic salamander species or the more charismatic treefrog, turtle, and snake species found in the southeast region of the state. The Piedmont has great potential for future surveys because of the lack of previous survey effort and due to its location at the intersection of many species' distributions to the east and west. During the thirteen years of conducting the herpblitz survey the survey effort has been spread across the state. To date, 3 surveys have been

performed in the coastal plain, 3 times in the Piedmont (including this survey), 5 times in the blue ridge, once in the ridge and valley, and twice in the Appalachian plateau.

Survey Sites

The following is a general description of the survey sites. GPS coordinates were provided either by direct measurement or from Google Earth. Refer to Figure 1 for a map of Featherfin WMA with the sites indicated.

Site 1. (N 37° 22' 16.4"; W 78° 35' 39.4") Mixed pine and deciduous forest. Dominant trees: Pines, Maple, Sycamore, Tulip Poplar, White Oak and Sweet Gum. Dominant understory: Paw Paw, Spice Bush, and Redbud. Site 1 was surveyed on 15 June 2019.

Site 2. (N 37° 21' 42.7"; W 78° 33' 57.3") Deciduous forest. Dominant trees: Walnut, Beech, Sweet Gum, White Oak, Tulip Poplar, and Maple. Dominant understory: Paw Paw, Spice Bush, Stinging Nettle, Christmas Ferns. Site 2 was surveyed on 15 June 2019.

Site 3. (N 37° 21' 30.9": W 78° 33'32.6") Deciduous forest. Dominant trees: Walnut, Beech, Sweet Gum and Ironwood. Dominant understory: Paw Paw, Sourwood, and Stinging Nettle. Site 3 was surveyed on 15 June 2019.

Site 4. (N37° 21' 44": W 78° 33' 19") Mixed pine and deciduous forest, much had been timbered in the recent past. Dominant trees: Virginia Pine, Loblolly Pine, Sweet Gum, Chinquapin Oak, Tulip Poplar and Sycamore. Site 4 was surveyed on 16 June 2019.

Site 5. (N 37° 22' 43.3": W 78° 33'56.8") Deciduous Forest. Dominant trees: White Oak, Scarlet Oak, Beech, Walnut, Maple, Pin Oak, and Tulip Poplar. Dominant understory: Christmas Fern, Club Moss and Redbud. Site 5 was surveyed on 16 June 2019.

MATERIALS AND METHODS

A diversity of techniques were used to find reptiles and amphibians including: hand capture, visual observation, flipping over and replacing cover objects such as logs, rocks, tin, and other debris, and listening for calling anurans. Turtle trapping was not possible due to there being no man-made or natural ponds or deep vernal pools on the property.

Each animal captured was examined for malformations, disease, parasites, and overall health. After inspection each animal was released at the capture site. Digital photos were taken of each species and voucher photos were deposited in the VHS Digital Archive. All data sheets have been deposited in the VHS Archive. Table 1 documents the amount of survey effort given to each site.

RESULTS

During the survey 63 animals were observed or captured including 6 species of amphibians (three anurans and three

salamanders) and 7 species of reptiles (one turtle, two lizards, and four snakes). Table 2 summarizes the species and number of animals were found at each site.

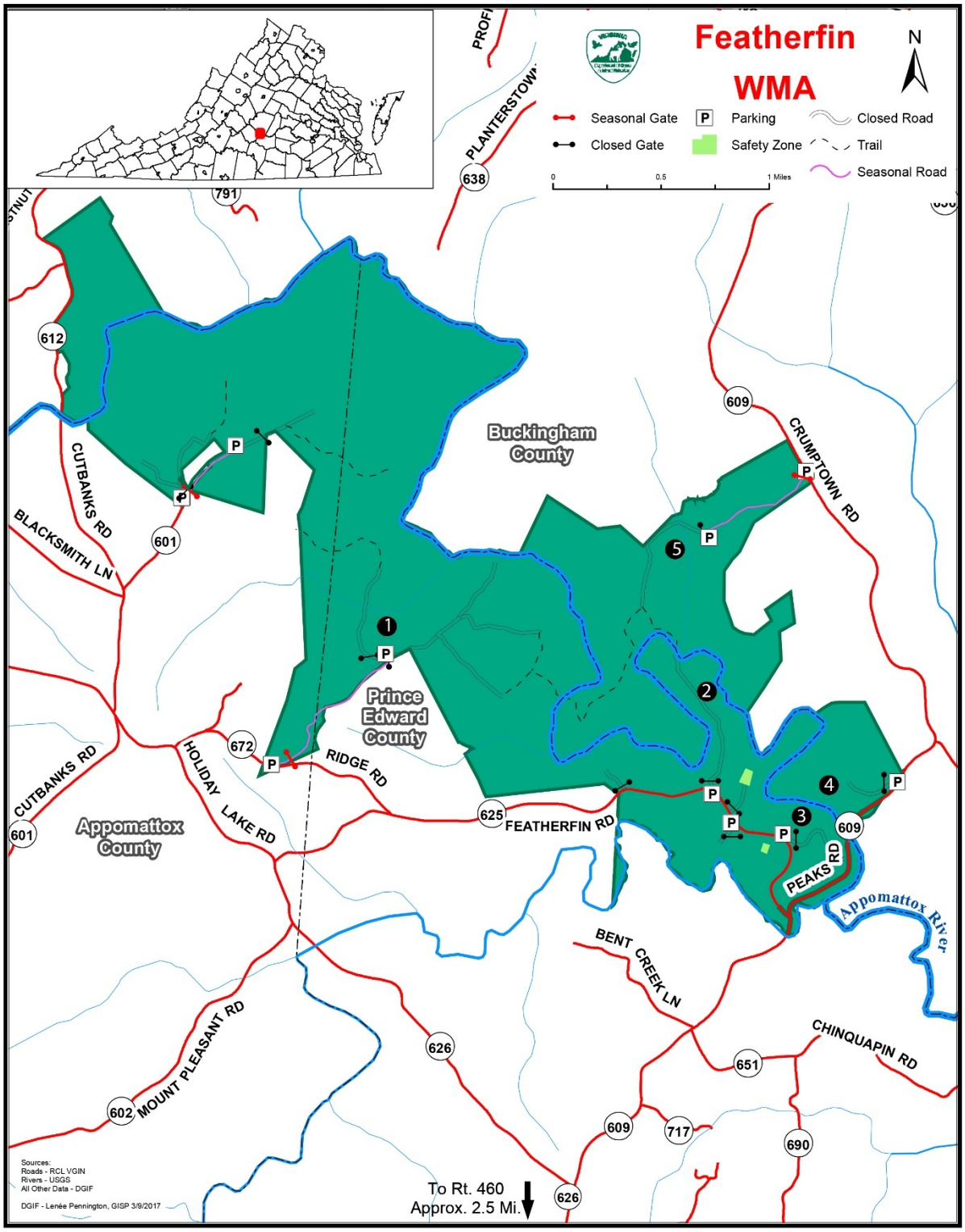

Figure 1. Featherfin WMA with five survey sites indicated.

Table 1. Summary of work effort at the different sites sampled during the Featherfin WMA Survey.

Site	**1**	**2**	**3**	**4**	**5**
# Persons	12	12	12	11	11
Hours	2.25	1.5	1.25	1.0	1.5
Person Hours	27	18	15	11	16.5

Table 2. Amphibians and Reptiles observed at Featherfin WMA.

Species/Site	**1**	**2**	**3**	**4**	**5**	**Total**
Amphibians						
Acris crepitans	6	4				10
Anaxyrus a. americanus	3				1	4
Anaxyrus fowleri	1	7	1		8	17
Notophthalmus v. viridescens	1				1	2
Pseudacris crucifer	1	2			1	4
Pseudotriton r. ruber		1				1
Amphibian Total	12	14	1	0	11	38
Reptiles						
Carphophis a. amoenus	2		1		1	4
Coluber c. constrictor			1		1	2
Pantherophis alleghaniensis			1			1
Plestiodon fasciatus	1	1				2
Scincella lateralis					1	1
Terrapene c. carolina	4	3	3	4		14
Thamnophis s. sirtalis			1			1
Reptile Total	7	4	7	4	3	25
Grand Total	19	18	8	4	14	63

ANNOTATED CHECKLIST

Amphibians

1. *Acris crepitans* (Eastern Cricket Frog)*:* Eastern Cricket Frogs were found at sites 1 and 2 near a stream (site 1) and vernal pool (site 2).

2. *Anaxyrus a. americanus* (Eastern American Toad)*:* Three Eastern American Toads were found at site 1, two on a dirt road and one under a log. One was found at site 5 near a fallen tree on the forest floor.

3. *Anaxyrus fowleri* (Fowler's Toad)*:* Fowler's Toad was the most common amphibian found at the Featherfin WMA with a total of 17. They were found at four of the five sites, the exception being site 4. Most were found either on a dirt road, or the

edge of the forest bordering open fields. Some were seen foraging on the forest floor.

4. *Notopthalamus v. viridescens* (Red-spotted Newt)*:* Two red efts were observed. One was found on a mossy log in site 1, and the other near a dirt road at site 5.

5. *Pseudacris crucifer* (Spring Peeper)*:* Four adult Spring Peepers were observed at sites 1, 2, and 5. Three were seen on the forest floor and one was on low vegetation in the deciduous woods.

6. *Pseudotriton r. ruber* (Northern Red Salamander)*:* One Northern Red Salamander was found dead on the forest floor, in the open, at site 2. The salamander was a large adult showing the more purple coloration large adults can develop. There were no signs of injury or disease, and no decay, indicating the death had been quite recent.

Reptiles

7. *Carphophis a. amoenus* (Eastern Wormsnake)*:* A total of five Eastern Wormsnakes were found during the survey, from sites 1, 3, and 5. All were found under or within woody debris.

8. *Coluber c. constrictor* (Northern Black Racer)*:* Two Northern Black Racers were found during the survey, one each at sites 3 and 5. Both were adults basking in a sunny area. The one at site 5 was captured, the one at site 3 was observed but escaped capture. The specimen from site 5 had some damage, old scars, on the tail.

9. *Pantherophis alleghaniensis* (Eastern Ratsnake)*:* One adult Eastern Ratsnake was captured from vines growing up a large tree, about two meters from the ground at site 3.

10. *Plestiodon fasciatus* (Common Five-lined Skink)*:* Two Common Five-lined Skinks were captured at sites 1 and 2. Both were found on downed logs in the forest.

11. *Scincella lateralis* (Little Brown Skink)*:* One adult Little Brown Skink was found in the leaf litter at site 5.

12. *Terrapene c. carolina* (Woodland Box Turtle)*:* A total of 14 Woodland Box Turtles were found during the survey. This was the most frequently encountered reptile of the survey. They were found at all sites except site 5. Four were dead and only the shells remained. One, a large male (12.3 cm carapace length, 19.7 cm width) had some damage to the shell.

13. *Thamnophis s. sirtalis* (Eastern Gartersnake)*:* One juvenile Eastern Gartersnake was found in site 3. It was curled up in herbaceous vegetation, approximately 10 cm off the ground. Such arboreal behavior is not common in Gartersnakes.

DISCUSSION

This survey yielded records for 13 species of amphibians and reptiles. This is the lowest yield of species for any herpblitz and will also be among the lowest for any survey conducted by the VHS. It is amazing that we did not find a Green Frog or hear a Gray Treefrog during the survey as these are two of the most common species found throughout the state. This species list should be much higher as indicated by previously reported species lists from herp surveys that have been conducted in Appomattox, Buckingham, and Prince Edward Counties. Mitchell (2006) reported 19 species of amphibians and 14 species of reptiles in a two-year survey of Appomattox Court House National Park only 18 km away. The Park

contains 705 hectares (1,743 acres), significantly less area than Featherfin WMA. Goodman and Carter (2017) reported finding 10 species of amphibians and 16 species of reptiles during a 5-year survey of Hampden-Sydney College in Prince Edward County. Sattler and Gibson (2016) reported finding 16 species of amphibians and 18 species of reptiles in a two-day survey of James River State Park in Buckingham County. In a 6-hour survey of Appomattox-Buckingham State Forest and Holliday Lake State Park, Anthony (2019) reported finding 12 species of amphibians and 10 species of reptiles. This survey was conducted only 5 km west of Featherfin WMA. The VHS database has records of 49 species of reptiles and amphibians for Prince Edward County, 46 species for Buckingham County, and 44 species for Appomattox County.

The paltry number of species found during this survey is most likely due to Featherfin WMA lacking the necessary habitat to allow large anuran and salamander populations to flourish. Until these habitats are established, through natural or man-made means, the amphibian diversity will continue to remain low. The master WMA plan outlines the fact that 18 hectares of the original property were wetlands that were ditched and drained. This land should be converted back into wetlands. This would increase the number of amphibians. If a few other wildlife water impoundments were created, or beaver dams allowed, the opportunity for more amphibians to be re-established would increase dramatically. This could also increase the diversity of other taxonomic groups as well.

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Natural History Notes on the Anurans of White Oak Mountain Wildlife Management Area

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Abstract: For the past 20 years, we have been collecting observations made on anurans from White Oak Mountain Wildlife Management area in northern Pittsylvania County. Thirteen species of anurans were observed at this site. This paper covers the phenology, parasites, and additional natural history observations we made over the course of the survey period. We report on the activity dates, calling dates, distribution, and various natural history notes on the anurans found at White Oak Mountain Wildlife Management Area.

Keywords: phenology, natural history, frogs, toads, chiggers, necrophilic amplexus, *Ambystoma talpoideum*

INTRODUCTION

Currently, Virginia hosts a total of 28 frogs and toads (Mitchell, 2017). Of these, two new species, *Pseudacris nigrita* and *Lithobates kauffeldi*, have been added since 2003 (Hobson and Moriarty, 2003; Feinberg et al, 2014). The state list is most likely now complete, but the late additions demonstrate there may still be species to be discovered. What is still far from complete is our knowledge of each species distribution in Virginia. A good example is the range of *Hyla gratiosa,* the Barking Treefrog. Before 2012, this species was known from only a few counties and was classified as State Threatened by the Department of Game and Inland Fisheries. In 2012, Ryan Niccoli (2012) published a new county record for this species. After that a wave of records and reports submitted to iNaturalist indicated the species was more widespread than previously thought (Roble and Jones, 2013; Munford, 2014 a,b,c; Rose, 2017; Watson, 2018). These observations call into question the state threatened status of this species, as well as how much we really know about the range of any species, rare or common. Finding the location of anurans is easier than many groups of animals due to male vocalizations during the mating season. Despite this, distribution information remains murky in Virginia. Reporting on anuran geographic differences, morphometric measurements, and basic patterns of phenology is much harder work and, as a result, little is known on any of these topics.

Few studies have been conducted on anuran life histories. A few relevant examples include: anuran egg clutch sizes (Mitchell and Pague, 2014), anuran vocalizations (Tupper et al, 2012; Garriock and Reynolds, 2005), general anuran phenology (Mitchell, 1986), diet (Mitchell, 1992; Georgel, 2001), habit associations (Mitchell, 2002; Fredericksen and Boyd, 2012), and juvenile dispersal (Fredericksen et al, 2014). Considerable information has been gathered concerning anuran habitats, species associations, calling phenology, and other natural history information by the annual surveys done by the Virginia Herpetological Society, but this data has not been summarized to discern broad life history patterns or geographic differences. Much work could be done to better understand regional differences in

phenology, morphology, and other aspects of anuran life histories. The purpose of this paper is to summarize 20 years of observations of the anurans of White Oak Mountain Wildlife Management Area in Pittsylvania County, Virginia. It is hoped that this study will motivate others to initiate long-term studies of life history patterns.

White Oak Mountain Wildlife Management Area is found in the south-central piedmont in Pittsylvania County. It is a 1,100-hectare (2,748-acre) property that was purchased as a series of farming tracts between 1967 and 1999. The property consists of a mixed of hardwood forests, pine forests, open lands, and wetlands. The topography is rolling hills that range in elevation from 150-275 meters (500 to 900 feet). The wetland area consists of perennial and intermittent streams, seeps, vernal pools, and 12 ponds ranging in size from 0.08 – 2.5 ha (0.2-6 acres). The ponds are all man-made and historically served as irrigation sources for the surrounding agricultural fields. This area lies within the Dan River watershed and is drained by the Banister River. The Banister River borders the northern part of the property for 12 km (7.5 miles).

Survey Sites

The following is a general description of each survey site which contained more than five species (Figure 1).

Site 1 consists of several intermittent streams, one of which flows out of a large wetlands area in site 2. The stream substrate is comprised of sand and many rocks. Bordering the stream is a mature hardwood forest.

Site 2 has experienced many changes during the course of this survey. In the early years of this survey, there was a large pond created by damming an intermittent stream. The dam collapsed and was then reconstructed to make a smaller pond the size of which could be regulated. After the breach of the original dam and the resulting lowering of the water level in the basin, many vernal wetland areas were created. The current level of the pond is regulated by the WMA manager. It is being managed as a wildlife impoundment during the winter and is drained at the end of each summer to prevent large fish populations from being established. The pond is currently an important breeding site for *Ambystoma talpoideum*, and the pond is regulated to help enhance that species. A mature hardwood forest borders one side of this area and a pine forest borders the other.

Site 3 contains a 0.44-hectare fishing pond and an outflowing intermittent stream. Around the pond are planted wildlife crop fields. Around the stream is a mature hardwood forest.

Site 4 contains 2 small man-made ponds with an outflowing intermittent stream. This area has many planted wildlife crop fields.

Site 13 contains a long series of shallow and deeper vernal pools surrounded by a hardwood forest.

Site 14: The most interesting feature of this site is a large vernal pool which appears to be created by a road that was built over a low drainage area. This vernal pool is surrounded by a mature hardwood forest. Some years water stays in the pool all year round, but this is only in extremely wet years. Most summers the pool dries completely.

Site 18 consists of several seeps and an intermittent stream. Mature hardwood forest surrounds this stream in some areas; the forest has been recently logged in the past few years along parts of the stream.

Site 24: A 0.27-hectare man-made pond is one of the major features of this site. It has an intermittent stream flowing into and out of the pond. A hardwood forest surrounds the pond.

Site 25 contains a 0.73-hectare pond with an intermittent stream flowing in and out of the pond. A hardwood forest surrounds the pond.

Site 28: This site contains an intermittent stream, a large shallow vernal pool, a man-made vernal pond, and a series of small woodland vernal pools scattered through a hardwood forest. The man-made vernal pond appears to be a dug-out spring, perhaps for irrigation. This vernal pond contains water all year in wet years but completely dries in dry years.

MATERIALS AND METHODS

Observations on anurans for this study were made from 16 January 2000 until the present. During this time, observations for salamanders, turtles, lizards, and snakes were also collected and will be the subjects of future papers. Trips to White Oak Wildlife Management Area were not consistent but off and on as time allowed, often on weekends. The wildlife management area was visited during every month of the year. Survey methods used include hand capture, flipping logs and rocks, setting plastic bottle traps, road cruising, visual observations, and listening for calling males during the day and at night. All anurans hand captured were inspected for disease, injury, malformations, and parasites.

RESULTS

After 20 years of searching we report a total of 13 species of frogs (Bufonidae (2), Hylidae (5), Microhylidae (1), Ranidae (4), and Pelobatidae (1) inhabiting White Oak Mountain Wildlife Management Area (Table1). Because of the extensive field work, over many years, during all months of the year, we believe this totally defines all the anurans that occur at this site. In the following annotated species accounts we report observations gathered on habitat preferences, activity dates, calling dates, egg laying dates, mortality events, disease, injury, and parasitic infections observed. All common and scientific names follow Crother (2017).

Annotated species accounts

Acris crepitans (Eastern Cricket Frog)

Eastern Cricket Frogs were found in many different habitats. Frogs were found on roads, adjacent to agricultural fields, along the margins of large and small man-made fishing ponds, along the margins of streams entering and exiting fishing ponds, beside road rut ditches, along the margins of vernal pools, and on the forest floor of woods surrounding all of the above mentioned habitats. This species was found widespread across all areas of the wildlife management area and is the most abundant anuran observed. In fall 2019, hundreds if not thousands, were observed around the shoreline of Pete's Pond at site 2. The earliest activity date for this species was 2 January 2005 and the latest activity date was 30 December 2019. Frogs were found active in every month of the year. The earliest calling male was heard on 21 March 2008 and the latest was heard on 19 August 2010. Most calling males were observed along the margins of man-made fishing ponds or the streams entering or exiting these ponds. Large choruses of males were heard from late April to mid-July. Despite inspecting many frogs for malformations, injury, and parasites none were noted. One dead frog was found on 5 April 2014, the cause of death was not apparent. In April 2020 a number of Cricket

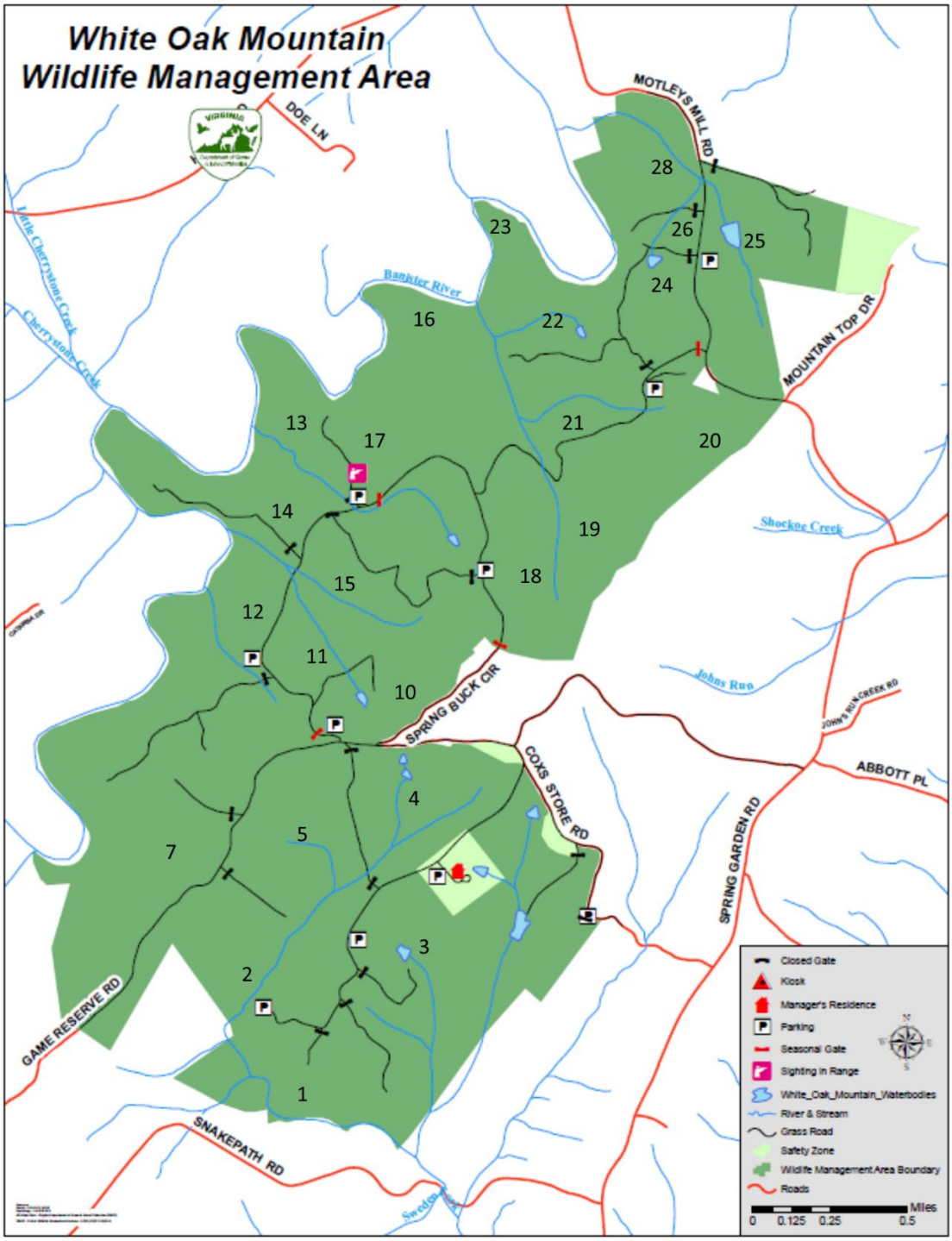

Figure 1. Survey sites within White Oak Mountain Wildlife Management Area.

Table 1. Summary of anurans found on White Oak Mountain Wildlife Management Area by site location.

Site /Species	1	2	3	4	5	7	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	28
Acris crepitans	*	*	*	*			*				*	*			*	*			*	*	*	*	*	*
Anaxyrus a. americanus	*	*	*	*							*										*			*
Anaxyrus fowleri	*	*									*							*						*
Gastrophryne carolinensis		*																						
Hyla chrysoscelis		*																				*		*
Hyla versicolor	*	*												*			*					*		*
Lithobates catesbeianus		*	*	*				*		*	*				*	*		*			*	*	*	*
Lithobates clamitans	*	*		*				*	*		*				*						*	*		*
Lithobates palustris	*	*	*			*			*	*	*		*		*	*	*				*	*		*
Lithobates sphenocephalus	*	*								*												*		*
Pseudacris crucifer	*	*	*	*	*					*	*		*	*	*	*		*						*
Pseudacris feriarum	*	*	*	*	*				*	*	*	*	*	*					*			*	*	*
Scaphiopus holbrookii											*													

frogs were captured, measured and weighed, then released. For males the average SVL was 20.87 mm ±0.91, range 18.97-22.18, n=39. For females the average SVL was 23.54 mm ±1.46, range 21.1-25.96, n=17. For males the average weight was 1.016 g ±0.156, range 0.758-1.266, n=39. For females the average weight was 1.431g ±0.322, range 1.013-2.02, n=17.

Anaxyrus americanus americanus **(Eastern American Toad)**

Eastern American Toads were found in the following habitats: mature hardwood forests, along the margins of man-made fishing ponds, along the margins of ephemeral streams flowing into and out of fishing ponds, on gravel roads, on paved roads bisecting mature forest land, in and adjacent to vernal pools, in dry stream beds, on grassy paths, and inside rotten logs. This species was found widely in the wildlife management area but tended to cluster around vernal pools and man-made fishing ponds. American Toads are very abundant at White Oak Mountain. The earliest activity date for this toad was 25 February 2012 and the latest activity date was 5 October 2005. Eastern American Toads were found active in every month in between these dates. The earliest calling date was 25 February 2012 and the latest date was 26 April 2008. Although individual males could be heard calling from February to April, large breeding events were the normal observation. These explosive breeding events occurred between 10 March and 3 April. Variation in temperature and precipitation from year to year would determine if these explosive bouts of

breeding would occur earlier or later in March and April. Warm temperatures and heavy rain seem to precede explosive breeding. In any one season, most breeding would occur in one day. It was affectionately called "toad day." The largest breeding population we observed was 136 toads on 19 March 2011. This population was breeding in a man-made pond (Pete's Pond). Toad day could occur at night or during the day depending on environmental factors. During these mass breeding events males would call from the shoreline, sitting on floating branches or submerged trees, or from floating vegetation or mats of floating grass. Amplexed pairs of toads were observed from 11 March in 2009 to 30 March in 2005. Mating balls of up to six males trying to amplex one female were observed on several occasions. During these breeding frenzies, males would try to amplex each other, usually eliciting a release call, and on multiple occasions males would try to amplex our hands. Egg laying dates ranged from 11 to 29 March. We collected few observations on tadpoles, but we did observe American Toad tadpoles eating a dead Red-spotted Newt (Gibson and Mitchell, 2006). Since this species explosively breeds, it was easy to collect hundreds at a time and inspect them for malformations, diseases, injuries, and parasites. On 12 March 2006 62 frogs were hand captured and visually inspected. One frog had a hind leg striped to bone, one male 50 mm SVL had the right side of the body inflated (there were three skinned areas observed on the dorsum near the inflated area). On 12 March 2010, 84 toads were collected and inspected for disease. One toad had an amputated foot all others were intact and healthy appearing. One toad was found with one chigger and another was found having three chiggers, thus 3.6% of the collected population had chiggers (Figure 2). The chiggers are intradermal Trombiculid mite larvae (Gibson and Sattler, 2006) and found on a number of amphibian species in the WMA. On 13 March 2016 we found one female and one male at a man-made pond parasitized with chiggers. The female had one chigger and the male had 2 chiggers. This was the first and only observation of a female with chiggers. On 19 March 2011, 136 toads were captured and inspected for disease and injury. Of the animals collected 113 were males and 23 were females. One toad had an amputated leg. One toad had two large red swellings on its chest and one on the side of its mouth. These swellings were 3 mm in diameter. Sixteen toads were found to be infected with chiggers. All these toads were male. This represents 12 % of the breeding population. The number of chiggers on toads ranged from 1 to 24, with the mode equaling one. Fifteen percent of males from this population had chiggers. On 21 March 2010, 82 toads were caught in and along a large fishing pond. Of the captured toads, 62 were males and 20 were females. All these toads appeared healthy. One toad had a patch of grey/whitish skin on the side of its head (Figure 3). This observation is consistent with the condition called axanthism as outlined by Jablonski et al (2014). Six toads were observed with chiggers. Two males had one chigger each, three had two chiggers each and one had three chiggers. Seven percent of this breeding population had chiggers. On 29 March 2009 51 toads were collected. One male had a patch of skin missing. Six toads were found with chiggers, which is 12% of the population. These toads had chiggers on the chest, venter, and ventral portion of the legs. On 26 March 2015, 63 American Toads were collected. We measured these toads and again inspected them for chiggers. Of the 63 toads 1 was female and 62 were male. No chiggers were found on the female toad. Of the 62 males, 10 were found with chiggers. All the toads were measured. Males averaged 67.6 SVL $\pm$ 3.7 mm (59 - 78, n = 62) and females (two females were found on 24

March and averaged with the one female found on 26 March) averaged 81 SVL + 4.4 mm (78 – 86, n = 3). On 20 March 2020 a number of toads were captured, measured and weighed then released. For males the average SVL was 66.5 mm ±4.01, range 57.03-74.03, n=35. For females the average SVL was 72.76 mm ±7.46, range 62.3-87.73, n=8. For males the average weight was 24.9 g ±3.77, range 18.02-31.66, n=35. For females the average weight was 44.26 g ±16.94, range 25.33-80.5, n=8. In addition to the above listed injuries, one toad was observed with a broken hind leg. Carcasses of predated toads were frequently found during these mass breeding events. Often toad carcasses were found which had the skin peeled back and the entrails and muscle tissue eaten. Female toads that were predated would often have eggs surrounding the carcass, suggesting that the eggs were not edible to predators. Dorsal skin was always observed intact. Road mortality was observing on several occasions both on the paved road inside the wildlife management area and hard roads bisecting the area.

Figure 2. Male American Toad with numerous chigger mite parasites.

Anaxyrus fowleri (Fowler's Toad)

Fowler's Toads were found in leaf litter in mature hardwood forests, along the margin of man-made fishing ponds, along gravel roads,

Figure 3. Male American Toad with a patch of skin exhibiting axanthism.

in dry streambeds under rocks, on a hard surface road bisecting a mature hardwood forest of the wildlife management property, and in and adjacent to vernal pools. This species was not encountered as often as *Anaxyrus a. americanus*, thus we consider it uncommon. Fowler's toads are found more often in open habitats and are often found in modified areas such as pastures and fields (Dodd, 2013). This toad's abundance may have historically been higher when much of this area was active agricultural fields. The earliest date of activity recorded was 6 May 2006 and the latest activity date was 15 September 2007. Males were only heard calling from 26 May to 28 May. All vocalizations were heard from toads in man-made fishing ponds. Metamorphic toads were observed emerging from a man-made fishing pond on 11 June 2006 and 31 July 2005. Three toads found in early and mid-September were found to be parasitized by chiggers. Chiggers were found on the thighs, feet, and venter of these toads (Figure 4). We found one toad with asymmetrically sized parotoid glands. One parotoid gland was of normal size and the other was significantly reduced in size.

Figure 4. Fowler's toad with one chigger.

Gastrophryne carolinensis (Eastern Narrow-mouthed Toad)

This species was only found at one site on the wildlife management area property and is uncommon on the property. Eastern Narrow-mouthed Toads were found along the margin of a vernal pool and one toad was found under a log beside this pool. This vernal pool was created from the remains of a larger multi-acre man-made pond that was drained when the dam broke. Before this event Eastern Narrow-mouthed Toads were not detected at this site or anywhere on the WMA property. We first discovered this frog in 2008, nine years after starting this survey. The earliest activity date was 26 May 2008 and the latest date was 19 August 2010. The earliest calling date was 27 May 2009. On that date 15 males were heard calling at 1800 h and from 2115 h to 2315 h 12 males were heard calling. Males were also calling on 28 May 2009, 5 June 2008, 21 June 2008 and 19 August 2010. The 21 June observation included three males calling from the margin of a vernal pool at 1000 h in full sun with no rain.

Hyla chrysoscelis (Cope's Gray Treefrog)

This species is not widespread throughout White Oak Mountain. It generally has been found as calling males around man-made ponds, ephemeral streams coming into and out of man-made ponds, along the margins of vernal pools, and from trees in mature hardwood forests surrounding these habitats. Early and late dates of activity correspond to calling dates because this is the only way we could positively identify this species since it is phenotypically identical to *Hyla versicolor*. The earliest calling date was 12 April 2008 and the latest was 6 September 2011. On 19 August 2010 five *Hyla sp*. egg masses were found floating on the surface of a vernal pool and seven egg masses were found floating on the surface of a man-made pond. On 16 August 2014 *Hyla sp.* tadpoles were found in a tractor tire rut next to a vernal pool.

Hyla versicolor (Gray Treefrog)

The Gray Treefrog has a similar distribution and habitat preference as *H. chrysoscelis*. The earliest calling date was 23 March 2007 and the latest was 18 September 2005. Calling males were heard every month between these early and late dates.

Lithobates catesbeianus (American Bullfrog)

American Bullfrogs at White Oak Mountain WMA have been found in man-made fishing ponds, along the margins of streams flowing into and out of man-made fishing ponds, vernal pools, and flooded road ruts. The earliest activity date for this species was 6 January 2007 and the latest date was 8

November 2009. The earliest and latest calling dates were 26 April 2008 and 11 July 2001. All calling males were heard vocalizing from man-made fishing ponds. On 19 March 2006 one adult frog was found dead along the margin of a pond. The animal's body was torn open and it appeared to have been partially eaten by a predator. On 9 July 2004 one Dead on Road (DOR) adult was found on a hard surface road bordering a pond. In general American Bullfrogs seemed to be rarely found. We are not sure if this is due to our just not seeing them, if this species is simply rare in this area, or if hunting and predation pressures limits its numbers.

Lithobates clamitans (Green Frog)

Habitats where the Green Frog was found include man-made ponds, streams flowing into and out of made-made ponds, vernal pools, wet road ruts, under rocks and logs in streambeds, ditches along trails, on hard paved roads by ponds, and in seeps. The earliest activity date for Green Frogs was 28 January 2007 and the latest date was 9 October 2010. Between those months, Green Frogs were found active in every month. The earliest date of male vocalizing was 12 April 2008 and the latest date was 25 August 2010. Rains occurring late in August in many years would illicit male vocalizing. Most vocalization would occur along the margins of man-made fishing ponds but some observations were made from the margins of vernal pools. Calling was not limited to nighttime hours. Daytime calling occurred between 0846 h to 1541 h. One dead Green Frog was found on 28 January 2007 and a necropsy found Ichthyophonus-like infection in the skeletal muscles of this animal (Gibson et al, 2008). As stated for the American Bullfrog, this species seemed to be observed rarely. It is JG's observation that this species is very wary and it quick to hide or jump into water when it senses any commotion, thus perhaps accounting for our low number of observations.

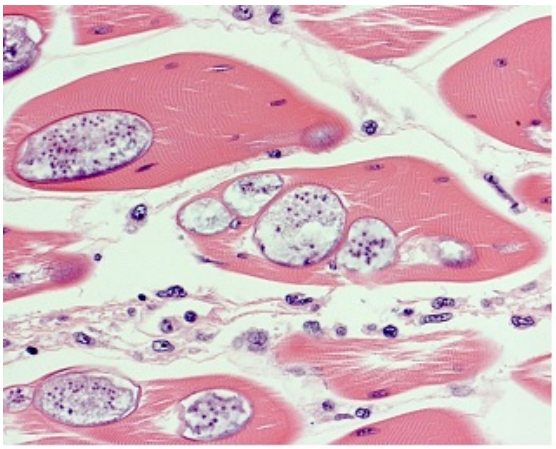

Figure 5. Ichthyophonus-like infection in the skeletal muscle of Lithobates clamitans (from Gibson et al., 2008).

Lithobates palustris (Pickerel Frog)

Pickerel Frogs were widely found throughout the White Oak Mountain WMA. This species was observed along the margins and in man-made fishing ponds, in the streambeds flowing into and out of man-made ponds, under rocks in ephemeral streams running through hardwood forests, along the margins of vernal pools, on a hard paved road bisecting a hardwood forest, and under rocks along the margin of the Banister River. It must be emphasized that the most common place to find adult and juvenile frogs was under rocks in stream beds. The earliest recorded activity date was 4 March 2008 and the latest activity date was 8 November 2004. The earliest date of calling was 9 March 2003 and the latest was 19 April 2006. All calling males were observed calling in the water along the edges of man-made fishing ponds. Many observations were made of males calling between 1130 h and 1418 h. Eggs were observed from 12 March 2006 until 9 April 2006. Twenty-six egg masses at one pond was the highest we

recorded. Most egg masses were attached to submerged sticks and grass and Pickerel Frogs typically deposit eggs deeper than the sympatric Coastal Plains Leopard Frogs. On 20 May 2007 many metamorphic Pickerel Frogs were observed along the margin of a man-made pond. On 30 March 2013 a dead male Pickerel Frog was found along the margin of a man-made fishing pond. This animal was found to have 32 chigger mites on its abdomen and legs (Figure 5). Other Pickerel Frogs captured had chigger mites on hind legs, forelegs, venter, and the webbing of feet. No chiggers were observed on the dorsal area of any frogs. Chigger parasitism was observed from March through October. Throughout our survey period we found several dead frogs, likely representing predation events. One frog was found DOR on Route 649 which bisects part of the wildlife management area.

Figure 5. Pickerel Frog with chigger mites on hind legs.

Lithobates sphenocephalus
(Coastal Plains Leopard Frog)

White Oak Mountain Wildlife Management Area is one of the most western locations for Coastal Plains Leopard Frogs in Virginia. They are reported farther west and north from a single individual at Smith Mountain Lake State Park in Bedford County, and two individuals from southern Botetourt County. Coastal Plains Leopard Frogs are not widespread on this property. These frogs clustered in a few areas around man-made fishing ponds and vernal pools. Habitat preferences were man-made ponds, the streams entering and exiting man-made fishing ponds, vernal pools, and the mature hardwood forests surrounding these habitats. This species seems to utilize more ephemeral wetland habitats than other species in its genus. Most breeding by this species occurred in fish free habitats or long cycle vernal pools. It seems to have a competitive edge over other members of its genus in these habitats. The earliest call date was 28 February 2011 and the latest date for the spring season was 21 June 2008. Continuous and overlapping calling males can be heard from 28 February to 30 March. This species also has a fall breeding season from 19 August 2010 to 28 October 2010. Between 19 August and 28 September male calling can be continuous and overlapping, given the right environmental conditions. Calling during the daytime hours is common. Breeding for this species appears to be explosive with smaller egg laying events during a spring breeding season. Amplexed pairs were found as early as 28 February (Figure 6). Small mating balls of 2 males trying to amplex one female have been observed (Figure 7). On 14 March 2015 necrophilic amplexus was observed between a live male frog and a dead male frog (Figure 8).

Figure 6. Normal amplexus

The earliest egg laying date was 28 February 2011 and the latest date was 18 April 2008, for the spring egg laying season (Figure 9). The earliest egg laying date for a late summer to fall breeding season was 10 August 2010 and the latest was 3 October 2010 (Gibson and Sattler, 2010a). Most egg masses are deposited in large communal groups. The largest communal mass of egg was deposited

Figure 7. Mating ball with two frogs attached to female and one male approaching to the left

Figure 8. Necrophilic amplexus (note the male being amplexed has a fixed and dilated pupil.

on 17 March 2010 and numbered 160 masses, indicating there is a large population on the property. Some egg masses are attached to needle rushes, cattail leaves, or other vegetation, but most are just deposited on the bottom substrate of the pool or pond. Egg masses are typically deposited in shallow water and are therefore close to the surface and susceptible to being stranded when water levels drop (Figure 10). When tadpoles hatch out of the egg capsule they stay attached to the egg jelly. When an egg mass is moved, and the larvae are in Gosner stage 19, tadpoles will swim back to the egg jelly.

Figure 9. Egg laying

Figure 10. Shallowly deposited egg mass.

Metamorphic frogs can be found emerging from ponds beginning 9 May until 19 July. This species is very susceptible to being parasitized by intradermal chigger mites. Both males and females have been found to be prey to this parasite. Chigger mites can be found on the venter, legs, and webbing between toes (Figure 11). One male found on 14 March 2015 had 34 chigger mites. It is not uncommon to find dead Coastal Plains Leopard Frogs, probably due to the large numbers that explosively breed together and

the easy prey they become to predators. On 6 September 2011 one DOR frog was found in a parking lot adjacent to a vernal pool. This species was not commonly found at White Oak Mountain WMA until after 2006. In one area of the property, before 2006, there was a large man-made fishing lake held back by a dam. Leopard frogs were not observed inhabiting the lake. In 2006 the dam broke and the lake drained leaving behind marshy vernal pools. In 2009 gates were put in and a much smaller pond was formed in the remaining basin of the larger lake. Since 2006 the population of Leopard frogs, American Toads, Eastern Narrow-mouthed Toads, and *Ambystoma talpoideum* have exploded in this new habitat.

Figure 11. Female with chigger mites on hind legs.

***Pseudacris crucifer* (Spring Peeper)**

Spring peepers are found widely distributed across the wildlife management area. Spring Peepers are found along the margins of man-made fish ponds, vernal pools, ephemeral streams, marshy wetlands, and hardwood forests surrounding these habitats. Observations have been made on this species every month except for July. The earliest activity date was 6 January 2007 and the latest activity date was 30 December 2019. The earliest calling date was 6 January 2007 and the latest spring date was 23 April 2006. On 3 March 2012 necrophilic amplexus was observed between a live male frog and a dead female (Figure 8). Males can also be heard calling from 21 September to 30 December and all months between those dates. Amplexed pairs were found from 25 February to 19 March. On 29 March 2009 one pair of males were found amplexed venter to venter. Metamorphs have been found from 26 May to 29 June.

Figure 8. Necrophilic amplexus

***Pseudacris feriarum* (Upland Chorus Frog)**

Upland Chorus Frogs appear to utilize the shallowest and most ephemeral types of wetlands. This species was found occupying the margins of man-made fishing ponds, wet seeps, flooded tire ruts, flooded tractor tire ruts in agricultural fields, margins of small streams, small puddles, road and trail side ditches, vernal pools, and the hardwood forests surrounding all these habitats. This species is very widespread over the wildlife management property. The earliest activity date for *Pseudacris feriarum* was 6 January 2007 and the latest date was 30 December 2019. No observations were made of this species in the months of May through September and the month of November. The earliest calling date was 6 January 2007 and the latest date was 19 April 2003. The largest choruses of frogs were heard from 10

February to 30 March. Outside of the spring season a few males were observed calling on 30 October 2004, 12 and 27 December 2015, 28 December 2008 and 30 December 2019. These observations occurred during unseasonably warm temperatures. Breeding sites included wet seeps, vernal pools, the margins of man-made fishing ponds, flooded tire ruts, and trailside ditches. The earliest amplexed pair of frogs was found on 21 February however, the earliest observation of eggs was 18 February 2000 and the latest date was 30 March. Eggs were always found attached to some kind of submerged object such as grass, pine straw, sedges or other vegetation. One amplexed pair found on 9 March 2013 were kept overnight in a plastic bucket and the female laid 476 eggs. This value is similar to the average reported by Mitchell and Pague (2014).

***Scaphiopus holbrookii* (Eastern Spadefoot)**

Despite 20 years of searching on this property only one observation for this species was made. On 11 July 2001 a 16mm SVL Spadefoot toad was found foraging in leaf litter by a large vernal pool. This observation represented a county record and was reported in Gibson (2001a).

DISCUSSION

Our opportunistic surveys of White Oak Mountain Wildlife Management Area over 20 years yielded an anuran fauna of 13 species. There is only one species recently reported for Pittsylvania County, *Lithobates sylvaticus*, that was not found at this location (Schutz et al., 2018). This species being loud and producing distinctive egg masses would most likely have been found if it occurred at the WMA. Our species list is identical to another reported anuran survey in the city of Danville, 26 km to the south of White Oak Mountain WMA (Gibson and Sattler, 2010b). In the discussion that follows we will compare our dates of activity, calling dates, and other observations to five literature sources that cover eastern, northern, central, and southwestern Virginia. Ernst et al. (1997) studied herpetofauna in northern Virginia including Arlington, Fairfax, and Prince William counties with intensive surveys being conducted at Fort Belvoir Military Installation. They report on incidental observations made starting in 1972 but the main body of their work was done from August 1987 to October 1992 at Fort Belvoir. Mitchell and Roble (1998) studied reptiles and amphibians at Fort A.P. Hill in Caroline county from 1992 – 1995. They also summarize all the work that had been previously been conducted at this site. Mitchell (1986) conducted a study at Chesterfield Airport, located in Chesterfield County, from March – September 1979 and March – August 1980. Gibson (2001b) studied the amphibians and reptiles of Powhatan County from February 1997 through November 2000. Garriock and Reynolds (2005) studied amphibians and reptiles at Radford Army Ammunition Plant in southwestern Virginia from 1997-1998. One of the main reasons we publish this report is to add to the existing literature and add another site location for anuran observations.

We report that Eastern Cricket Frogs (*Acris crepitans*) were active every month of the year in our southcentral Virginia site. The earliest activity date was 2 January 2005 and the latest was 30 December 2019. These observations were made during periods where there were several warm days in the midst of winter weather. This observation highlights that fact that frogs enter brumation, not hibernation like mammals and on warm days in winter will emerge and be active. In another survey of herps from the Piedmont of central Virginia, Gibson (2001b)

also found Cricket frogs active in every month of the year. He reported call dates from 8 April to 12 July (Gibson, 2001b), which is bracketed by our observations of 21 March to 19 August. Ernst et al., (1997) report Cricket frog breeding activity from 10 April to about 25 July for Ft. Belvoir and Mason Creek National Wildlife Refuge in Northern Virginia. This represents a later and shorter breeding season than seen in our more southern location. Mitchell and Roble (1998) report activity dates between 12 April and 22 November and calling dates between 18 April and 4 August at Fort A.P. Hill in Caroline County (a more northern location). Their observations which they collected over many years shows shorter activity and calling dates compared to our more southern location. Outside Virginia and to the west, Green and Pauley (1987) report that Cricket frogs emerge in mid-March with choruses beginning in April or May, peaking in June and July. These are later dates than reported here, but they are from regions with higher elevations.

The American Toad (*Anaxyrus a. americanus*) is widely distributed in eastern North America. It is found in a variety of habitats, both at White Oak Mountain Wildlife Management Area, and generally. We reported activity dates of 25 February to 5 October, which generally aligns with milder temperatures. We report calling dates from 25 February to 26 April. In Powhatan County, Gibson (2001b) reports calling activity of 27 February to 17 May. In Radford and Pulaski Counties, Garriock and Reynolds (2005) report mating from late March to late May. Ernst et al (1997) report most American Toad breeding in their northern Virginia site occurs during the first three weeks of April but males have been heard calling as early as mid-March and as late as May. Mitchell and Roble (1998) did report 21 February as the earliest calling time for this species at Fort A.P. Hill. In Ohio, the earliest call date is 20 March for both northern and southern Ohio, with the latest calling date of 29 May in northern Ohio (Brune, 2013a). This is later than the dates reported here, but again, their region is farther north with a later spring.

Large numbers of American Toads would congregate at breeding ponds in the spring. This presented the opportunity to examine numbers for injury and disease. Several animals were found with missing, broken or otherwise injured limbs. One wonders if the injuries are delivered by potential predators, repulsed by the skin toxins toads are known to produce. When instances of predation were observed, the skin (containing the toxins) was peeled away and left when the entrails and muscle are consumed. The most common type of parasite found was larvae of a mite, encysting in the skin, usually of male toads. Since there have not been reports of toads of different sexes inhabiting different habitats or feeding grounds, one wonders if males are more likely to encounter these mites along the shores of breeding ponds, where females spend less time than males, or if males are more susceptible because of higher levels of corisol during an extended breeding season.

Fowler's Toads (*Anaxyrus fowleri*), although widespread in eastern North America, were less commonly encountered than American Toads at the Wildlife Management Area. Fowler's Toads seem to prefer dryer, more open areas than American Toads (Brune, 2013b) which may suggest they were more numerous in the past when the Wildlife Management Area was farmland rather than the present woodlands. Another reason we may have observed fewer is they tend to be nocturnal (Burne, 2013b) and most of our surveys were daytime. We report activity dates of 6 May to 15 September. This is later

than the American Toad, which is known to breed earlier (Burne, 2013b). We report calling dates from 26 to 28 May, which is a narrower range than 23 April to 28 June in Powhatan Country (Gibson, 2001b) where they were more prevalent than American Toads. Ernst et al. (1997) report the largest Fowler's Toad breeding events to occur the second week of May through June but that calling males can be heard from late April through July. Mitchell and Roble (1998) did not report large choruses of males at Fort A.P. Hill, but heard males sporadically in late April through July and on occasion in August. In northern Ohio where 14 years of calling dates were recorded, dates ranged from 1 April to 30 May. Chiggers were observed to parasitize Fowler's Toads as they do American Toads.

Eastern Narrow-mouthed Toads (*Gastrophryne carolinensis*) were not common at the Wildlife Management Area, being found only at site 2. There, they were not observed until 2008, nine years into the survey, after the dam forming Pete's Pond broke and created a vernal pool. The toads were found only at the vernal pool. The observed activity period was 26 May to 19 August and the calling activity was 27 May to 19 August. The majority of our observations were mating calls. Narrow-mouthed Toads are summer breeders (Dorcas and Gibbons, 2008) and our observations are consistent with this. Narrow-mouthed Toads have been reported in Danville City (Gibson and Sattler, 2010b) with a calling date of 5 June. Mating calls were also reported in Powhatan County on 7 July (Gibson, 2001b). Mitchell and Roble (1998) reported finding calling males on 25 April and 26 May for Fort A.P. Hill. Mitchell (1986) found narrow-mouthed toads calling from 22 July through 18 August in Chesterfield County.

Cope's Gray Treefrog (*Hyla chrysoscelis*) was either not common at the Wildlife Management Area, or difficult to find due to its arboreal nature. Most observations were hearing mating calls, which is also the only easy way to differentiate them from the morphologically similar *Hyla versicolor*. Activity and calling dates are thus identical, from 12 April to 6 September. Late spring to summer breeding seems typical for Cope's Gray Treefrog as calling dates of 12 and 28 June were reported for Powhatan County (Gibson, 2001b) and 4 June for the City of Danville (Gibson and Sattler, 2010b).

The Gray Treefrog (*Hyla versicolor*) was found a bit more commonly than Cope's Gray Treefrog (Table 2). Again, the mating call is the only easy way to differentiate it from Cope's Gray Treefrog. Activity and calling dates are similar, from 23 March to 18 September. Other activity reports from Virginia are again mostly call dates. At nearby Danville City they were calling on 4 June (Gibson and Sattler, 2010b), on 12 and 28 June in Powhatan County (Gibson, 2001b) and mid-May to late July in Radford (Garriock and Reynolds, 2005). Ernst et al (1997) reported these species were heard calling from early May into July for their northern Virginia site. Mitchell and Roble (1998) record only *Hyla chrysoscelis* male calling between 18 April and 8 July at Fort A.P. Hill.

The American Bullfrog (*Lithobates catesbeianus*) is not a common species at the Wildlife Management Area. This is possibly due to the adult preference for large, permanent bodies of water (Krishna and Krishna, 2013) and the scarcity of such habitats at the Wildlife Management Area. While juveniles disperse away from such habitats upon metamorphosis and may be more widely found, calling males were heard only at man-made ponds. Calling dates were

26 April to 11 July, corresponding to their late spring to summer breeding period (Dorcas and Gibbons, 2008). Other calling dates from Virginia include 4 June in Danville City (Gibson and Sattler, 2010b), 28 March to 12 July for Powhatan County (Gibson, 2001b), mid-May to mid-June for Radford (Garriock and Reynolds, 2005), 25 April through 8 July for A.P. Hill (Mitchell and Roble, 1998) and late April or May until late July (Ernst et al, 1997). Activity dates for the Bullfrog ranged from 6 January to 8 November. Early activity (9 January) was also noted by Gibson (2001b) in Powhatan County. Garriock and Reynolds (2005) recorded activity from March to September in Radford. Mitchell and Roble (1998) report early and late dates of 15 March through 17 October for A.P. Hill; this is a much more narrow activity period than we record for this species at White Oak Mountain WMA.

Green Frogs (*Lithobates clamitans*) can be found in smaller bodies of water, and are a habitat generalist (Owen and Austin, 2013). They were active for a large part of the year, 28 January through 9 October. Mating calls were heard from 12 April through 25 August. Gibson (2001b) reported calling from 18 April to 28 June in Powhatan County, Ernst et al (1997) reported calling from early May through late July in northern Virginia, Mitchell and Roble (1998) reported calling dates from 25 April through 8 July for Fort A.P. Hill, and Garriock and Reynolds, (2005) from mid-May to early July in Radford. Mitchell (1986) also reports late summer breeding up to 9 September at a site in central Virginia. This bimodal breeding, late spring and late summer, may give green frogs and leopard frogs (another species seen with this strategy) an ecological advantage in producing offspring which will metamorphose at different times of the year.

The Pickerel Frog (*Lithobates palustris*) was one of the more widely distributed species at the Wildlife Management Area. After breeding in permanent bodies of water, they frequently disperse throughout the surrounding woodlands (Lehtinen, 2013). They typically have a long season of activity (Lehtinen, 2013) from late March to October in Ohio. We reported activity from 4 March to 8 November at our site. Mitchell and Roble (1998) had a more abbreviated early and late date of 28 April and 14 October for Fort A.P. Hill and Gibson (2001b) reports activity from 9 February through 22 September in Powhatan County. Mating calls were heard from 9 March to 19 April at the Wildlife Management Area. These dates may underrepresent the actual breeding period since the calls are not loud and may be missed either by their low intensity or the fact that males can call from underwater (Given, 2005; P. Sattler, personal observation). Gibson (2001b) reports calling from 28 March to 19 April in Powhatan County and Ernst et al (1997) report breeding from March and early April and lasts into May for northern Virginia. Mitchell and Roble (1998) have calling dates for Pickerel Frogs at Fort A.P. Hill calling from 27 March until 16 September. Pickerel Frogs were not infrequently found to be parasitized by chiggers, sometimes at a high intensity.

The Coastal Plains Leopard Frog (*Lithobates spenocephalus*) is present at the Wildlife Management Area as one of the most western sites in Virginia. There was one individual reported farther west in Bedford County and two individuals from Botetourt County. At the Wildlife Management Area there is a large breeding population at site 2 with 160 egg masses observed in 2010. Leopard Frogs were not commonly observed until after 2006, when a dam forming Pete's Pond at site 2 broke creating a smaller and shallower yet permanent pond. In the south, the Coastal

Plains Leopard Frog breeds from the fall through the spring. In southcentral Virginia, this is an early spring, then a fall breeding season. In the spring, males were heard calling from 28 February through 21 June. Ernst et al (1997) reports this species being rare in his northern Virginia sites. They report hearing calling males in March at Huntley Meadows Park. Mitchell and Roble (1998) also report this species being rare at Fort A.P. Hill. They only heard Leopard frogs calling on 5 and 14 March. In the fall breeding season, males were heard calling from 19 August through 28 September. Mitchell (1986) also reported a bimodal calling season from 22 February to 15 April and 1 September to 23 September in Chesterfield County. Eggs were typically deposited in one large communal mass. They were laid in shallow water where they were subject to both freezing temperatures and stranding by falling water levels. Coastal Plains Leopard Frogs were subject to parasitism by chiggers, with both sexes often showing infections.

The Spring Peeper (*Pseudacris crucifer*) is widely distributed throughout the Wildlife Management Area. They were found in a wide variety of habitats, although many of our observations were of calling males. They were observed in all months of the year save July. They were found to be active from 6 January through 30 December. Spring Peepers are known for being one of the earliest breeders in the spring (Dorcas and Gibbons, 2008). Calling during the spring breeding season was recorded from 6 January to 23 April. Calling during the fall was reported from 21 September to 30 December. This is similar to Powhatan County were Gibson (2001b) reported calling from 21 January to 23 April. Mitchell and Roble (1998) report calling dates from late February until mid-April at Fort A.P. Hill.

The Upland Chorus Frog (*Pseudacris feriarum*), like the Spring Peeper, is also an early breeder in the spring. They were heard calling from a wide variety of aquatic habitats, ranging from permanent ponds to temporary tire ruts in fields. The earliest activity recorded was 6 January and the latest was 30 December. Mating calls in the spring were heard from 6 January to 19 April. This is similar to what Gibson (2001b) found in Powhatan County (18 January to 12 April), but earlier than Garriock and Reynolds (2005) found at Radford (mid-March to mid-May) which is at a higher elevation. Ernst et al (1997) reports breeding for this species begins in March and continues to the third week of April in Fairfax County and Mitchell and Roble (1998) report Upland Chorus Frogs on only two dates, 21 February and 29 March at Fort A.P. Hill.

Only one Spadefoot Toad (*Scaphiopus holbrookii*) has been found in the almost two decades of surveying at White Oak Mountain Wildlife Management Area. The newly metamorphosed toadlet was found foraging near a large vernal pool and represented a new distribution record for Pittsylvania County (Gibson, 2001a). While we do not, from a single observation, have activity or breeding data, Gibson and Anthony (2019) recently reported their efforts at soliciting such information from volunteers in Virginia. They report activity from 12 January to 26 December, with calling reported from 25 February to 8 September. While Spadefoots do occur on the Wildlife Management Area, they are one of the most difficult anurans to document, being largely fossorial and nocturnal. Large numbers of Spadefoot Toads were reported from Danville City (Gibson and Sattler, 2010b) only about 20 km south of the Wildlife Management Area.

Only the Wood Frog (*Lithobates sylvaticus*) is known for Pittsylvania County but not

documented for White Oak Mountain Wildlife Management Area. They are found to all counties to the north and west of Pittsylvania. Their presence in the county was only recently documented (Schultz et al., 2018) on private property. Their distinctive call and egg morphology make it unlikely they were missed in the almost 20 years of surveying the area. We believe they are not (yet) present at the Wildlife Management Area, but survey efforts will continue in the future.

Long running surveys such as this are important for building a database of activity periods, phenological dates, and information on morbidity and mortality. The authors encourage other herpetologists in the state to begin adopting areas and systematically collecting data so we can better understand regional life history patterns of anurans.

There is much left to be learned about the anurans of White Oak Mountain Wildlife Management Area. What are the clutch sizes of all 13 species, what are the parasites living in and on the anurans, what diseases do longer living species acquire, what is the lifespan of animals of each species, and how have human alterations to the environment affected each species? Herpetology work in Virginia, and at the Wildlife Management Area is far from finished.

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Newport News BioBlitz (Herp Results)

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Abstract: On May 20-21, 2017, 46 Virginia Herpetological Society volunteers participated in a multi-taxon Bioblitz hosted at Newport News Park in the City of Newport News, Virginia. During this 24-hour event 407 total animals were observed including 16 amphibian species (11 frogs and 5 salamanders) and 20 reptiles (7 turtles, 4 lizards, and 9 snakes). Thirty-four Eastern Cricket Frogs were collected. This represented the most prevalent amphibian. The Eastern Wormsnake was the most common reptile and animal species collected during the survey. We collected 48 in total. An adult leucistic Wormsnake was collected in the Grafton Ponds survey area as well as two *Ambystoma mabeei*. Numerous Red-eared Sliders (*Trachemys scripta elegans),* an introduced and naturalized species, were present in the reservoir and golf course pond.

Key Words: *Ambystoma mabeei*, amphibians, leucism, Grafton Ponds, reptiles, *Trachemys s. elegans*

INTRODUCTION

On May 20 -21, 2017 the VHS participated in a muti-taxon Bioblitz hosted at Newport News Park (NNP) in the City of Newport News. Many groups came out for the 24-hour Bioblitz and surveyed for insects, birds, and plants. The VHS led its members in collecting data on reptiles and amphibians. One of the authors (KS) was a main organizer and spent countless hours preparing maps and organizing this event. The herp survey team had 46 participants, which by far was the largest group at the event. More than 100 total surveyors participated in the Bioblitz and found a combined 532 species of plants and animals.

Newport News Park is located in both the City of Newport News and York County. This region lies in the coastal plain physiographic province and is part of the York River and James River watersheds. NNP encompasses more than 3,116 hectares and surrounds two reservoirs, Harwoods Mill Reservoir (104 ha) and Lee Hall Reservoir (93 ha). Within the boundaries of the park is an area of sinkhole ponds that has been designated Grafton Ponds Natural Area Preserve. This 152-ha property is owned by the city of Newport News but managed by the Virginia Department of Conservation and Recreation. Characterization of Grafton Ponds can be found in Roble (1998) and Roble and Stevenson (1998). The park is surrounded by suburban and urban sprawl which encroaches from all directions. There are heavily traveled main roads on all sides and several major roads bisect the park. Within the park boundaries are many kilometers of trails for hiking and biking, a campground, and a boat ramp allowing visitors with boats to access the reservoirs.

One of the earliest lists of species from York County and Newport News was compiled by Engeling (1969). He found 14 species of

amphibians and 29 species of reptiles (one frog on his list, the Wood Frog, must have been a misidentification as it is currently found nowhere near Newport News (Mitchell and Reay, 1999). The amphibians and reptiles and other select fauna at Grafton Ponds have been studied by the Department of Conservation and Recreation Natural Heritage Scientists. Roble (1998) and Roble and Stevenson (1998) document species for the area and cover previous zoological surveys of Grafton Ponds. Wright and Gray (2000) published a review of copperheads on the York/James peninsula with a few notes on Northern Cottonmouths and Canebrake (Timber) Rattlesnakes. Dolan and Christensen (2007) conducted a study of turtles at Fort Eustis and Christensen (2009) published the results of a VHS survey of Colonial National Historic Park in York County. In addition to these papers there are numerous field notes published on observations and species' ranges from this area. Records of museum specimens collected from this area can be accessed at Vertnet.org.

When reviewing the documented species in the above listed references and Mitchel and Reay (1999), this area hosts a herpetofauna with a high frequency of species having an austral (primarily southern) biogeographical association. VHS members who live outside the southeastern portion of the state rarely get a chance to see many of these species. This area also holds great interest since it hosts three rare species classified as state threatened: *Ambystoma mabeei*, *Ambystoma tigrinum*, and *Hyla gratiosa.*

Study Sites

Below is a listing of sites with a general description and GPS coordinates taken from the center of the site.

Site 1. (37°12'46.08"N, 76°32'41.94"W)
Site 1 is located in the most northwestern part of the park. This area consists of a mixed pine and hardwood forest comprised mainly of Loblolly Pine, Red Maple, and White Oak. There is a small powerline cutting though this site in addition to a hiking trail.

Site 4. (37°11'11.36"N, 76°32'58.67"W)

Site 4 consists of roads and trails which border the Lee Hall Reservoir. Along the northeastern border of the city reservoir is an extensive freshwater marsh. A large freshwater pond is located on the eastern border of this site adjacent to a golf course.

Site 5. (37°11'6.17"N, 76°30'36.22"W)

Sites 5 and 6 encompass the area known at the Grafton Ponds Natural Area Preserve. Grafton Ponds represents a unique natural community of coastal plain sinkholes. In and around these two sites are over 100 vernal pools ranging in size from 10 m to 100 m in diameter (Roble and Stevenson, 1998). The canopy of the forest surrounding these ponds

consists of mixed hardwood and pine. Tree species observed include pine, Sweet Gum, Red Oak, Red Maple, White Oak, and American Beech. The understory includes Ironwood, Pawpaw, Blueberry, and Jack in the Pulpit.

Site 6. (37°10'42.56"N, 76°30'22.33"W)
See the description for site 5.

Site 9. (37° 8'58.24"N, 76°28'51.54"W)

Site 9 is located at the far southeastern end of Newport News Park. This site surrounds the Harwoods Mill Reservoir. The forest consists of mixed pine and oak hardwoods. There is also a pine/cypress swamp.

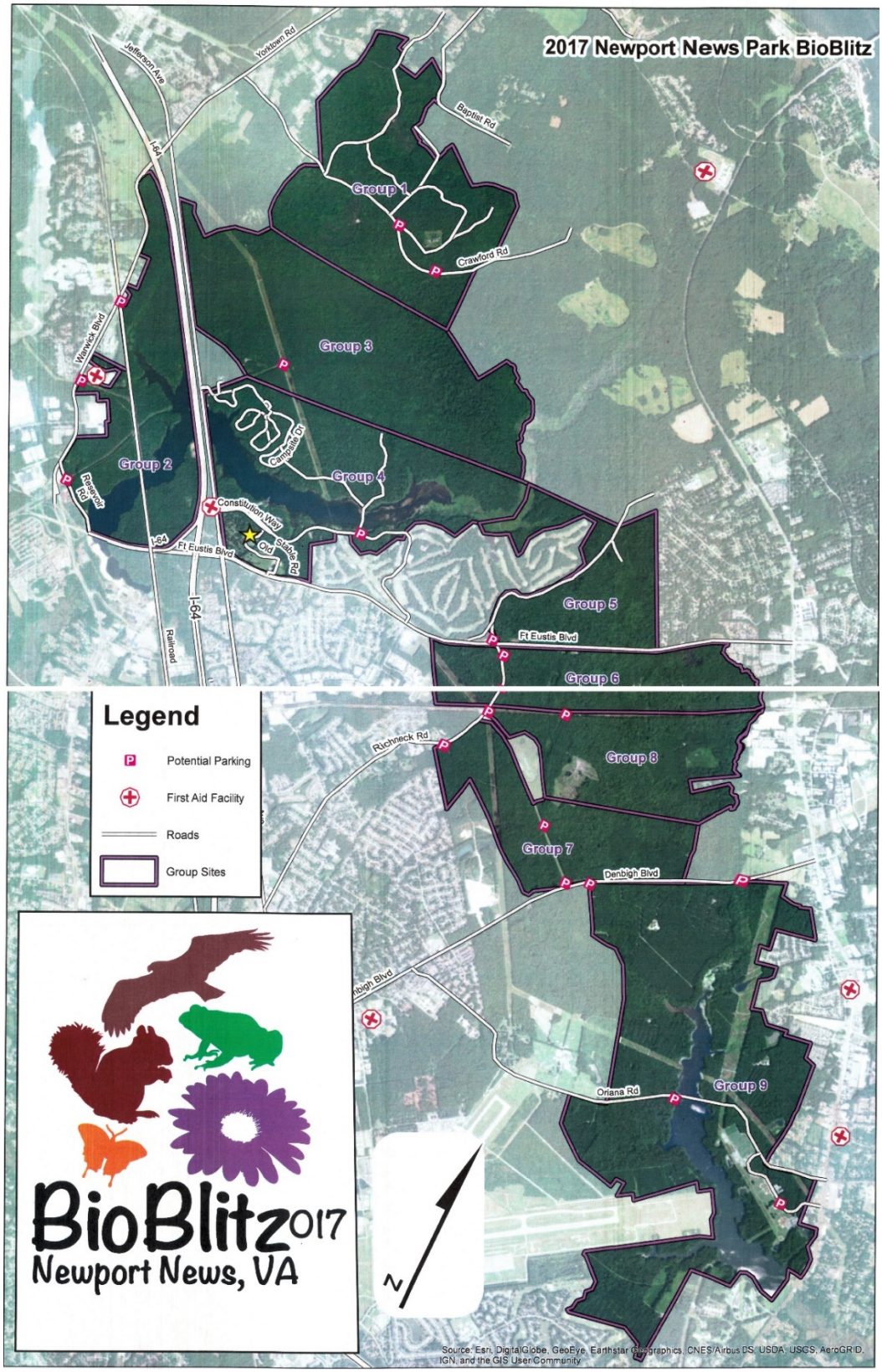

Figure 1. Map showing survey sites

MATERIALS AND METHODS

Upon arriving in the morning, all participants were put through the VHS disinfection protocol. All boots and equipment were dipped in a bleach solution. After disinfection, participants were briefed on safety precautions and on proper methods of rolling logs and rocks and replacing them. Volunteers for this survey utilized a wide variety of collecting methods including flipping logs and rocks, hand capture, visual observation, dipnetting, and listening for calling anurans. For two nights some survey members cruised county roads looking for live and DOR animals while listening for calling anurans. Each animal collected was inspected for abnormalities such as parasites, disease, injuries, or malformations. All animals were immediately released at the site of capture. Digital photos and digital audio recordings were collected to voucher any county records or abnormalities. The group leaders recorded all observations on standard VHS data collecting forms. These forms and relevant digital photos have been placed in the VHS physical and digital archives. See Table 1 to view the amount of survey effort given to each collecting site.

Table 1. Collecting effort per site at the Newport News BioBlitz Survey, 20-21 May 2017.

Site	1	4	5^a	5^b	6	9^a	9^b
Number of surveyors	5	6	15	16	6	4	9
Hours surveyed	4	5	4	3	4	5	3
Person hours of survey effort	20	30	60	48	24	20	27

5^a = part of site 5 surveyed on 20 May, 5^b = part of site 5 surveyed on 21 May, 9^a = part of site 9 surveyed on 20 May, 9^b = part of site 9 surveyed on 21 May.

RESULTS

A total of 36 species and 407 animals were found during the Newport News BioBlitz Survey. Of the species found, 16 were amphibians (11 frogs and 5 salamanders) and 20 were reptiles (7 turtles, 4 lizards, and 9 snakes). Table 2 summarizes the species found at each site and the number of animals observed. Following the table is an annotated species account. All scientific and common names follow Crother (2017).

Table 2. List of individuals found at each site, with totals, from Newport News Park BioBlitz. CT= Crayfish Trap in Deer Run Creek in Site 4; MT=Minnow Trap in Deer Run Creek in Site 4; TT= Turtle Traps in the pond by the golf course in Site 4. E= egg masses.

Sites	1	4	5^a	5^b	6	9^a	9^b	CT	MT	TT	Total
Anurans											
Acris crepitans	2		1		31						34
Anaxyrus a. americanus							2				2
Anaxyrus fowleri	3	5	4		2	7	4				25
Gastrophryne carolinensis	4	1		8	6						19
Hyla chrysoscelis	11	1	2	E	5						19
Hyla cinerea			1			1					2
Hyla squirella			1								1

Lithobates catesbeianus		1			4						5
Lithobates clamitans	1	6	6	2	14	2					31
Lithobates palustris					1						1
Lithobates s. utricularius	1		7	3	1	1	3				16
Salamanders											
Ambystoma mabeei				2							2
Ambystoma opacum			2	5	6		2				15
Amphiuma means			1				1		1		3
Eurycea cirrigera	1		2		1						4
Eurycea guttolineata			6								6
Turtles											
Chelydra serpentina		3	2							1	6
Chrysemys p. picta		7		6						8	21
Kinosternon subrubrum		1						1			2
Pseudemys rubriventris		1		1		1				1	4
Sternotherus odoratus								6		7	13
Terrapene c. carolina	2	3	2	1	3	8	2				21
Trachemys s. elegans		5					1			8	14
Lizards											
Plestiodon fasciatus		3	1	5	1	1	3				14
Plesriodon laticeps			1			1					2
Sceloporus undulatus	1	1		2	2	2	2				10
Scincella lateralis	2						2				4
Snakes											
Agkistrodon piscivorus		4				1	1				6
Carphophis a. amoenus	7		17	10	7	4	3				48
Coluber constrictor	1		1	3	2	2	4				13
Diadophis punctatus	1		11	1	2	2	3				20
Haldea striatula		1									1
Lampropeltis getula		3					1				4
Nerodia s. sipedon		1	2	1	1	1					6
Pantherophis alleghaniensis	1	2	1	2		5	1				12
Thamnophis s. sirtalis							1				1
Totals	38	49	71	52	89	39	36	7	1	25	407

Annotated Checklist
Amphibians:

1. *Acris crepitans* (Eastern Cricket Frog)

Eastern Cricket Frogs were found at sites 1, 5, and 6, along trails near water, at the edge of large bodies of water, and adjacent to a vernal pond. A large chorus of Cricket frogs

was heard during a night hike of the reservoir near the campground on 19 May prior to the survey.

2. *Anaxyrus a. americanus* (American Toad)
Two adult American Toads were observed on and beside a service road at site 9[b].
3. *Anaxyrus fowleri* (Fowler's Toad)

Fowler's Toads were found at all sites. Toads were found on the forest floor, in leaf litter, beside walking paths, in rotting logs and by the forest edge near a service road. Calling males were heard during a night hike along the margin of the reservoir near the campground on 19 May prior to the survey. Two Fowler's Toads were found with grayish discolored skin patches on the head region. This condition appears to be consistent with an anomaly of the chromatophores called partial axanthism (Jablonski et al., 2014).

4. *Gastrophryne carolinensis* (Eastern Narrow-mouthed Toad)

Eastern Narrow-mouthed Toads were found under logs and under bark at four sites (sites 1, 4, 5, and 6.

5. *Hyla chrysoscelis* (Cope's Gray Treefrog)

Cope's Gray Treefrogs were heard calling during the survey period at sites 1, 4, 5[a], and 6. The largest chorus included approximately ten males calling at site 1 at 0934 h. Only one adult was seen visually. It was sitting in the fork of a small Red Maple tree at site 1. Multiple treefrog egg masses were observed in tractor-tire ruts beside the road at site 5[b].

6. *Hyla cinerea* (Green Treefrog)

Adult Green Treefrogs were found in grass beside a road at site 5[a] and in grass by the edge of a lake at site 9[a]. Six *Hyla cinerea* males were heard calling along the margin of the reservoir near the campground at Site 4 on 19 May prior to the survey.

Figure 2. *Anaxyrus fowleri* showing axanthism on heads.

7. *Hyla squirella* (Squirrel Treefrog)

One male Squirrel Treefrog was heard calling in the woods at site 5[a]. Another male Squirrel Treefrog was heard calling from the wetlands adjacent to the White Oak Trail on 19 May prior to the survey.

8. *Lithobates catesbeianus* (American Bullfrog)

One bullfrog was found in mud in the reservoir at site 4. Two adult bullfrogs and two bullfrog tadpoles were observed at site 6.

9. *Lithobates clamitans* (Green Frog)

Green Frogs were found at all sites, in various habitats including sitting along the bank of a stream, sitting in a stream, sitting on logs, and under logs. Tadpoles were dipnetted at site 5. All life stages including tadpoles, metamorphs, juveniles, and adults were found. On 19 May at 1100 h a Green Frog was heard calling from a swamp adjacent to the White Oak Trail.

10. *Lithobates palustris* (Pickerel Frog)

One Pickerel Frog was heard vocalizing at 1103 h at site 6.

11. *Lithobates sphenocephalus utricularius* (Coastal Plains Leopard Frog)

Leopard frogs were found at all sites except 4, sitting along the banks of streams, at the edges of ponds, in grass, on the forest floor beside a stream, along the margins of vernal pools, in vernal pools, beside roadside ditches, along the margin of a Grafton pond and in pools made by tire tracks. One adult was found DOR by the boat ramp adjacent to the camp office.

12. *Ambstoma mabeei* (Mabee's Salamander)

Two adult Mabee's Salamanders were found at site 5[b] on 21 May. One was found under a log in the forest near a vernal pond. The other salamander was found under a log beside a walking path/road bordering a vernal pond.

Figure 3. Ambystoma mabeei, Mabee's Salamander.

13. *Ambstoma opacum* (Marbled Salamander)

Fourteen adult female and one adult male Marbled Salamanders were found under logs at sites 5, 6, and 9.

14. *Amphiuma means* (Two-toed Amphiuma)

One live and two dead Two-toed Amphiumas were found during the survey weekend. The live amphiuma was caught in a minnow trap baited with sardines. The trap was set in a small woodland vernal pool near Deer Run Creek at site 4. One amphiuma found dead in a Cyprus swamp at site 9[b] measured SVL 34.5 cm and TL 45.5 cm. Upon dissection massive internal bleeding was discovered around the heart region. No other damage was discovered. The other amphiuma was found dead along the shore of a stream at Grafton Ponds at site 5[a]. It measured SVL 26.7 cm and TL 33.4 cm. Investigation of the body found 1 large puncture wound on the side of tail and puncture wounds on the top and bottom of the head. The head was crushed. Dissection of the stomach yielded three small crayfish.

15. *Eurycea cirrigera* (Southern Two-lined Salamander)

Four Southern Two-lined Salamanders were found by streams and under logs near streams at sites 1, 4, and 5.

16. *Eurycea guttolineata* (Three-lined Salamander)

Six Three-lined Salamanders found at site 5[a]. Animals were found under logs by a stream, in the stream, and under logs in the forest beside the stream.

Reptiles

17. *Chelydra serpentina* (Snapping Turtle)

Three snapping turtles were found at site 4. One was on the forest floor. Another was caught in a hoop trap baited with sardines set in the pond near the golf course. One female was found at site 5[a] laying eggs beside a stream. Another large adult at site 5[a] was found in a wet basin created by a fallen tree.

18. *Chrysemys p. picta* (Eastern Painted Turtle)

Seven painted turtles were found at site 4. One was found in tall grass. Six others were observed in the reservoir. Five male and three female turtles were caught in hoop traps baited with sardines. These traps were set in the pond adjacent to the golf course at site 4. Six Eastern Painted Turtles were observed basking on logs in several of the Grafton Ponds at site 5[b].

19. *Kinosternon s. subrubrum* (Eastern Mud Turtle)

At site 4 two mud turtles were observed. One adult male was caught in a sardine baited crayfish trap set in a small creek. The other was found in Greenbrier creek.

20. *Pseudemys rubriventris* (Northern Red-bellied Cooter)

On 19 May at 0839 h, prior to the survey, a female Northern Red-bellied Cooter was observed by a small, artificial pond laying eggs. At 0900 h another cooter was observed crossing the main road entering the park. This adult was going from the reservoir to a large pond adjacent to the golf course. During the survey, several Red-bellied Turtles were seen crossing Constitution Way in Newport News Park, going from the Lee High Reservoir, presumably for nesting. A large adult cooter was observed DOR on the road next to the golf club pond at 1700 h. One Northern Red-bellied Cooter was observed basking at site 4, one adult red-bellied cooter was seen basking in a Grafton pond at site 5[b], one dried red-bellied cooter shell was found in the woods at site 9[a], and one cooter was caught in a baited hoop trap set in the pond by the golf course at site 4.

21. *Sternotherus odoratus* (Eastern Musk Turtle)

Six adult (three males and three females) Eastern Musk Turtles were caught in small streams at site 4 using baited crayfish traps. Seven musk turtles (five females and two males) were caught in baited hoop turtle traps set in the pond next to the golf course at site 4.

22. *Terrapene c. carolina* (Woodland Box Turtle)

Twenty-one Woodland Box Turtles were found at all sites during the survey weekend. Box turtles were found on the forest floor in leaf litter, sitting along the bank of a stream, under a log, submerged in a stream, by a lake in tall grass, and under a fallen tree. Three dried shells were found at two sites. One turtle found at site 1 had a swollen and closed

eye with pus coming out. A hissing sound was heard while the turtle was breathing, possibly indicating a respiratory infection. An adult male found at site 9[a] had a deformed shell produced by a healed crush injury. Three of the vertebral scutes were crushed inward and healed and several marginal scutes at the front of the turtle were damaged or missing.

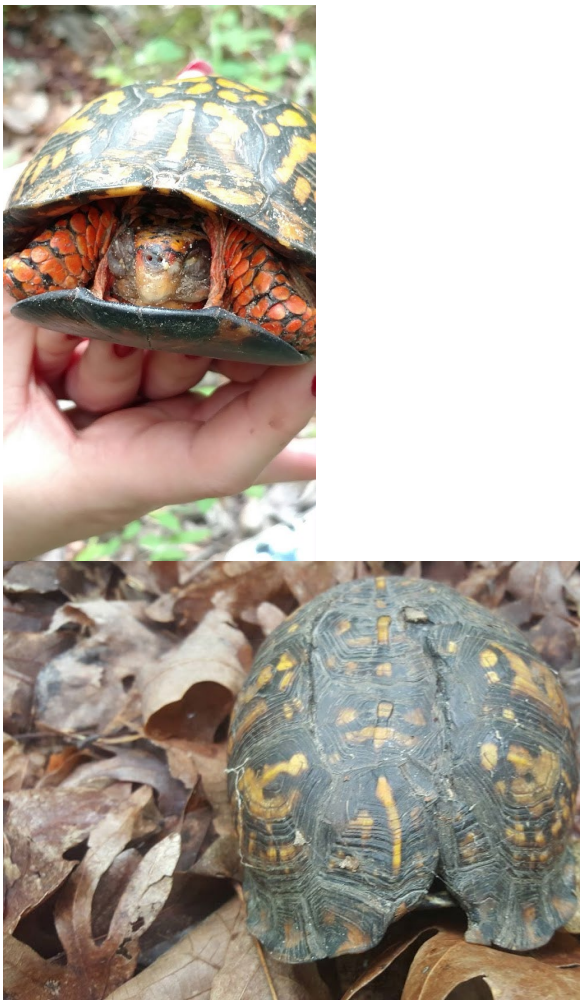

Figure 4. Woodland Box Turtles with possible respiratory infection, and damaged shell.

23. *Trachemys s. elegans* (Red-eared Slider)

Five Red-eared sliders were observed at site 4. One was on the side of the road and four were observed basking in a swampy area. Eight Red-ear Sliders were caught in baited hoop turtle traps set in the pond near the golf course at site 4. One neonate Red-eared Slider was found in the muddy water of a tire track in a power line right-of-way at site 9[b].

24. *Plestiodon fasciatus* (Common Five-lined Skink)

At site 4 one adult male was found on a dead tree. Another adult was found on a tree stump in a wetland. A third was found along Wynn's Mill Loop. One juvenile was found under bark at site 5[a]. Four adult females and one juvenile Common Five-lined Skink were found under bark, under logs, and in a log at site 5[b]. One Common Five-lined Skink was found under bark of a fallen log at site 6. One juvenile was found on a fallen log by a service road at site 9[a]. Three skinks were found under bark and fallen logs at site 9[b]. Mites were observed parasitizing one of the lizards.

25. *Plestiodon laticeps* (Broad-headed Skink)

On 19 May, prior to the survey, one male Broad-headed Skink was captured along the White Oak Trail. This lizard had a SVL of 112 mm and tail length of 120 mm for a total length of 232 mm. During the survey, one adult male was found basking on a log at site 5[a] and another adult was found on the edge of the woods at site 9[a].

Figure 5. Plestiodon laticeps.

26. *Sceloporus undulatus* (Eastern Fence Lizard)

Ten total Eastern Fence Lizards were observed at all survey sites. Fence lizards were observed climbing trees, beside the road, basking on trees, and on the ground. One lizard was found to have a tick and red mites attached.

27. *Scincella lateralis* (Little Brown Skink)

Two adult Little Brown Skinks were observed in leaf litter at site one. Two skinks were found in pine leaf litter at site 9[b].

28. *Agkistrodon piscivorus* (Northern Cottonmouth)

Four Northern Cottonmouths were found in and along the swamp at site 4. One adult cottonmouth was observed coiled by water at site 9[a]. One juvenile cottonmouth was found by a pond basking in leaf litter at 0930 h at site 9[b].

29. *Carphophis a. amoenus* (Eastern Wormsnake)

The Eastern Wormsnake was the most common animal found during the survey. A total of 48 were found. They were distributed among all sites except site 4 where none were observed. Wormsnakes were found under logs, under bark, under rocks, and in rotten logs. One adult wormsnake was found dead under a log at site 1. Inspection of the snake elucidated damage around the tail and head which may suggest it was predated. A leucistic wormsnake was found at site 5. It had a SVL = 197 mm and Total Length = 229 mm. It was donated to the Smithsonian Museum (USNM 592000).

Figure 6. Leucistic Worm Snake.

30. *Coluber c. constrictor* (Northern Black Racer)

One adult black racer was seen on the forest floor by the trail at site 1. One adult was found beside the road/trail at site 5[a]. Three black racers were observed at site 5[b]. One was basking on a log and the others were beside the trail/road running along site 5[b]. Two adult black racers were found at site 9a. One was by a service road. The other was coiled by a pine sapling. Four racers were found at site 9b. One was basking on a pile of sticks and the others were found on the forest floor.

31. *Diadophis punctatus* (Ring-necked Snake)

Twenty ring-necked snakes were found during the survey weekend. They were distributed among all sites except site 4 where none were observed. Snakes were found under bark, under logs, and inside rotten logs. Snakes were found with full yellow head bands and no spots, broken yellow head bands and spots and full yellow head bands and spots.

32. *Haldea striatula* (Rough Earthsnake)

A single adult Rough Earthsnake was found in the woods by the BioBlitz staging area at site 4.

Figure 7. Haldea striatula, the Rough Earthsnake.

33. *Lampropeltis getula* (Eastern Kingsnake)

A mating pair of Eastern Kingsnakes was observed at site 4 at 1355 h. on May 20. An additional adult kingsnake was found at site 4, basking along the margin of the pond near the golf course. The animal was observed when turtle traps were being pulled on 20 May. One juvenile kingsnake was found under bark beside a service road at site 9[b].

Figure 8. Emma Harris with Kingsnake.

Figure 9. Lampropeltis getula, Eastern Kingsnake

34. *Nerodia s. sipedon* (Northern Watersnake)

Six Northern Watersnakes were observed. They were observed at all sites except site 1. Watersnakes were seen in the reservoir, along the bank of streams, and beside vernal ponds.

35. *Pantherophis alleghaniensis* (Eastern Ratsnake)

Eastern Ratsnakes were observed at all sites except site 6. Twelve snakes were found in a variety of habitats including on the forest floor in leaf litter, in a log, climbing up a tree, in grass beside one of the Grafton ponds, in tall grass beside a road, in grass by the forest edge, and on a tree trunk by a stream. Several shed skins were found at sites 9[a] and 9[b].

36. *Thamnophis s. sirtalis* (Eastern Garter Snake)

One adult female was found basking in leaf litter by a pond at site 9[b].

DISCUSSION

A total of 36 species and 407 animals were found during the Newport News BioBlitz Survey. The species include 16 amphibians (11 frogs and 5 salamanders) and 20 reptiles (7 turtles, 4 lizards, and 9 snakes).

Seven turtle species were observed during the Newport News Park Survey. These were *Chelydra serpentina, Chrysemys p. picta, Kinosternon subrubrum, Pseudenmy rubriventris, Sternothernus odoratus, Terrapene c. carolina,* and *Trachemys scripta elegans.* All these, plus *Clemmys guttata* and *Malaclemys t. terrapin* are known from Newport News City and York County. There is a single record of the Diamondback Terrapin (*Malaclemys t. terrapin)* in Newport News in the FWIS database from the James River close to its entrance into the Chesapeake Bay. There are numerous reports from York County in the FWIS database. This is consistent with an unpublished volunteer-based statewide survey of terrapins in 2011 that had no observations of terrapins in two locations in Newport News, but terrapins were observed at six locations in York County along the York River (Tulipani, 2012).

There has been concern that the introduced Red-eared Slider (*Trachemys scripta elegans*) would hybridize with and eliminate the native Yellow-bellied Slider (*T. s. scripta*)(Mitchell and Reay, 1999). All sliders from Newport News Park were either Red-eared Sliders or intergrades with the Yellow-bellied Slider. In his checklist of Reptiles from York County, Engeling (1969) lists only the Yellow-bellied Slider. In the survey of turtles at Fort Eustis, Dolan and Christensen (2007) include only one Yellow-bellied Slider of 16 sliders observed. The remainder were Red-eared Sliders. An annual survey of turtles in Deer Park Lake, associated with the Virginia Living Museum (approximately 4.5 miles south of Harwood Mills Reservoir), has found that out of 157 aquatic turtles, 62 (40%) were Red-eared Sliders (Travis Land, pers. com.). Similar to the above studies, the ratio of Yellow-bellied Sliders was low (2%) to Red-eared Sliders. Farther south, the Yellow-bellied Slider may be faring better. Only one of 16 Sliders were the Red-eared Slider at Northwest River Park (Gibson and Bohon, 2009) and only 3 of 28 sliders were intergrades at Back Bay National Wildlife Refuge and False Cape State Park (Perry, 2013), the remainder being Yellow-bellied Sliders.

We found four lizard species during the survey. These included *Plestiodon fasciatus, Plestiodon laticeps, Sceloporus undulatus,* and *Scincella lateralis*. Of the four lizard species found during the survey, only the Broad-headed Skink (*Plestiodon laticeps*) was not previously recorded for Newport News City, although it was for York County. This species was prevalent in Newport News Park, but they are difficult to capture and obtain a positive identification, although their large size leaves little doubt as to their identity. One Broad-headed Skink from Newport News City was captured and identified by its five preorbital supralabial scales. Its size was SVL of 112 mm and tail length of 120 mm. The Southeastern Five-lined Skink (*Plestiodon inexpectatus*) is known both for Newport News City and York County. It is most likely present in the Park, but again, the difficulty of capturing them to get positive identification through examining scales makes verification difficult. Engeling (1969) records the presence of all these except the Broad-headed Skink in his checklist of York County Reptiles. An eastern fence lizard was found with a tick and mites attached to it.

There are only two older records of the Six-lined Racerunner (*Aspidoscelis s. sexlineata*) in York County. One is from near the Waller Mill Reservoir just east of Camp Perry, and the other from the northern end of the Colonial National Historical Park. The 2008 Yorktown Survey (Christensen, 2009) did not find them, but did include the other five species of lizard. This species is likely

present in the park. One should look in their preferred habitat, open sandy areas, to confirm or deny their presence.

We found nine snake species during the survey. These included *Agkistrodon piscivorus, Carphophis a. amoenus, Coluber constrictor, Diadophis p. punctatus, Haldea striatula, Lampropeltis getula, Nerodia sipedon, Pantherophis alleghaniensis,* and *Thamnophis sirtalis.* These species had all been previously documented from both Newport News and York County (FWIS database). Most of the Ring-necked Snakes (*Diadophis p. punctatus*) had the broken ring at the neck and spots on the venter, typical of the Southern Ring-necked Snake, although some had a complete ring. Newport News Park and York County fall within the intergrade zone between the Northern and Southern Ring-necked Snakes (Mitchell and Reay, 1999), so a mixture of patterns is not unusual. The Worm Snake (*Carphophis a. amoenus*) was the most common snake encountered. A leucistic specimen was uncovered in the Grafton Ponds area of York County and was donated to the Smithsonian Museum (USNM 592000). A pair of mating Eastern Kingsnakes (*Lampropeltis getula*) were photographed near the golf course pond. There are no previous records of time of breeding for Eastern Kingsnakes in Virginia (Mitchell, 1994) which makes this observation valuable. A Rough Earthsnake (*Haldea striatula*) was found just behind Picnic Shelter #19 prior to the start of the Bioblitz. There are several records for York County to the north. One was reported from the US Naval Weapons Station, one just south of the intersection of Route 105 and 17, and one from the Colonial National Historical Park. Engeling (1969) included it in his checklist of Reptiles for York County. There is only one previous record for Newport News City in the DGIF FWIS database, but it appears to be from an unvouchered record in Toby (1985) according to Mitchell (1994). However, the Smithsonian Museum houses two specimens from Newport News City Park (Cat. No. 517802 and 517804) and the Carnegie Museum has a specimen from Newport News City (Cat. No. 136004) adjacent to Industrial Park Drive. There are several records from York County. A digital photograph was submitted to the VHS Archive (#434) as a voucher for our specimen.

Special attention was applied to the Eastern Copperhead (*Agkistrodon contortrix*). Copperheads had not ever been encountered at Newport News Park (Michael Poplawski, pers. comm.) until last year when one was found (Becky Holliday, pers. comm.). Unfortunately, this first observation is likely due to a park ranger translocating a copperhead to Newport News Park that matched the juvenile life stage of the one found (Emily Steele, pers. comm.). Copperheads have a state-wide distribution in Virginia but have irregular occurrences on the lower York-James Peninsula (Mitchell and Reay, 1999). Wright and Gray (2000) detailed the historical records and observations of copperheads on the York-James Peninsula, but none are within the surveyed area of this report. Wright and Gray assert that copperheads are likely to occur undetected in small enclaves, although one co-author of this report (KS) has not encountered any copperhead sightings on the York-James Peninsula since 2000. We did not find any copperheads during our survey, but any observations should be reported to the park.

Several Northern Cottonmouths (*Agkistrodon piscivorus*) were found. One group reported finding cottonmouths basking in the early morning near the Swamp Bridge at the eastern end of the Lee Hall Reservoir. Newport News Park is notable for being the

site for the state record in length for cottonmouths; it is one of the northernmost populations of the species; and it was the study site for a master's thesis fieldwork on cottonmouths. Passaro (2008) performed a mark and recapture study on 70 cottonmouths with PIT tags, and two individuals with radio transmitters. Although the entire Lee Hall Reservoir was searched for the presence of cottonmouths, all of the observations were within a Minimum Convex Polygon area of 32.8 ha. This area was localized around the Swamp Bridge and upstream to the east. Based on the recapture rate, Passaro estimated the population at the Swamp Bridge to be 219, with 6.68 snakes per ha. Another subpopulation is in the southern end of the survey area at Harwoods Mill Reservoir. City workers are very aware of a strong presence of cottonmouths there (Becky Holliday, pers. com.). The extent of the subpopulation at Harwoods Mill Reservoir has not been delineated like at the Swamp Bridge. However, all captures by the VHS were north of Oriana Road, which corresponds to the shallower and swampier end of the reservoir.

There were eleven species of frogs and five species of salamanders found during the Newport News Park survey. All 16 species had been previously recorded for either Newport News City or York County. The American Toad (*Anaxyrus a. americanus*) is not reported for Newport News City but is for York County where our specimens were found. The Eastern Cricket Frog (*Acris crepitans*) has been reported from both Newport News City and York County. The Southern Cricket Frog (*Acris gryllus*) is known for York County but not Newport News City. Cricket Frogs were reported, but without confirming photographic evidence all Cricket Frogs were considered Eastern. All other anuran species are known for both locations.

Mabee's Salamander (*Ambystoma mabeei*) was a species not previously seen by many of our members and the primary reason some came to this survey. The Grafton Ponds area in York County is known to have the largest population of this species in Virginia (Niccoli and Kleopfer, 2013). Diligent searching on Saturday May 20 did not turn up any adults or larvae, although several ponds were searched. A group returned to this area Sunday morning May 21 to continue the search farther north at site 5. They were rewarded by finding two adult individuals under logs. One of these was surprisingly not under the forest canopy but along a roadway, now a bike and jogging trail exposed to full sunlight. Several Marbled Salamanders (*Ambystoma opacum*) were also found in this same area. No *Ambystoma* larvae were observed in any of the ponds we examined. Suspected causes are the dryer than usual winter and spring the region had experienced.

The Amphiuma (*Amphiuma means*) is not often seen on our surveys. Only one has been captured in the last couple of decades, at Jamestown Island (Christensen, 2009). Although known from Newport News City, *A. means* was only recently verified from York County (Walden and Devan-Song, 2016). We were thus surprised to find three in the Newport News Park Survey. Predation by a bird was a probable cause of death in one, but why it was then not eaten is a mystery. Another large aquatic salamander has been observed in Newport News Park by former park employee, Vincent Passaro (pers. comm.). Near the Swamp Bridge in June 2004, Passaro took a single photograph of a Northern Watersnake in the process of consuming an undetermined siren (*Siren sp.*). The salamander had well developed forelimbs and external gills, which is consistent with the sirens. Hindlimbs were not visible in the photo, but the eyes did not appear to be well developed as they are in the

Dwarf Waterdog (*Necturus punctatus*). The Greater Siren (*Siren lacertina*) has been recorded from Sussex and Isle of Wight Counties and the Cities of Chesapeake and Virginia Beach. The Lesser Siren (*Siren intermedia*) has been recorded from Isle of Wight, Southampton and Sussex Counties and Suffolk City. Northern Watersnakes preying on *Siren sp.* was not included in Mitchell, 1994, although Mitchell and Gibbons (2010) records various water snakes, but not *Nerodia sipedon,* preying on sirens.

Newport News Park and the Grafton Ponds Nature Area, along with portions of the adjacent Colonial National Historical Park and Fort Eustis, provide an important natural area for wildlife in the middle of a heavily urbanized landscape. Without these natural areas, there would be no wildlife or outdoor areas for the public to enjoy. We commend the Park and County for the protections they provide. The only recommendation we would make is the removal of the landscape netting included with a fibrous material used to start grass in an open area along the shore of Lee Hall Reservoir. Netting such as this has been known to entangle, trap and kill snakes crawling through it (Mitchell et al., 2006). The VHS is thankful for the opportunity to be involved in the Survey and hopes the results will allow the Park to better manage its resources.

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This Bioblitz event began being organized more than a year prior to the event. The VHS would like to thank the other coordinators, Elisabeth Corrozza Wilkins, Dr. Shawn Dash, Michelle Burke, and Erin Chapman, for dedicating many hours and personal expense to this cause. Newport News Parks and Recreation deserves special recognition for hosting the Bioblitz and providing the use of their facilities to make the event possible. The Bioblitz received additional support from the Hampton Roads Bird Club and Lowes Home Improvement.

***Anaxyrus americanus* (American Toad)**. VA: City of Danville, Anglers Park (36°33'40.35"N, 79°21'29.38"W). 13 and 14 March 2020. Jason Gibson.

Diet: The American Toad has a diet which consists mainly of any invertebrate prey small enough to fit in its mouth (Dodd, C.K. Jr. 2013. Frogs of the United States and Canada. Two Volumes. Johns Hopkins University Press, Baltimore, MD. 982 pp.). Kirkland (1897. The habits, food and economic value of the American toad, *Bufo lentiginosus americanus* (LeC.). Hatch Experiment Station of the Massachusetts Agricultural College, Bulletin No. 46.) found worms, molluscs, crustaceans, myriapods, spiders, and insects in 149 American Toad stomachs that he collected from April to September in 1896. Kirland's study (op cit) found that 77% of prey items were insects; ants and beetles making up the largest bulk percentage at 19% and 22%, respectively. In a study in 1994 in a Canadian Jack Pine forest in Ontario, Bellocq et al (2000. The diet of coexisting species of amphibians in Canadian Jack Pine forests. Herpetological Journal (10):63-68.) found that the American Toad's diet consisted largely of beetles and hymenopterans. The family Formicidae made up 37.9% of prey items with other hymenopterans making up 13.6% and beetles 10.5%. There are many reasons why dietary studies are relevant today. These studies show ecological relationships, how nutrients are cycled through an ecosystem, and pathways through which toxins and pollutants bioaccumulate in the bodies of consumers. A.H. Kirkland was an entomologist interested in studying the diet of the American Toad in order to assess the economic value these animals provided to agriculture. From the data he collected in 1896 he estimated that toads could devour around 10,000 insects in three months, the great majority of the insects being injurious to agricultural crops. Based on the consumption of pest invertebrates, Kirkland estimated the economic value of a single toad at $19.88 (Kirkland, A.H. 1904. Usefulness of the American Toad. U.S. Department of Agriculture Farmer' Bulletin No. 196.). Dietary studies are important not only for understanding the role each species plays in an ecosystem but also exemplify the benefits they provide to ecosystem services, such as insect population control. The purpose of this note is to add to our knowledge of the diet of the American Toad.

On 13 March and 14 March, a DOR male and dead female American Toad at Anglers Park in the City of Danville. The female was found intact in a vernal pool. Mating was observed the previous night and this female might have drowned in the process. Both specimens were dissected, and the stomach contents were removed and stored in 95% ethanol. All prey items were identified to the lowest taxonomic unit possible. Although a number of the prey items were relatively intact, many were represented by fragmented body parts and identifiable only to family and/or genus. In addition to the prey (Table 1) there were also 2 pebbles and seven nematode worms (one in the male and six in the female). From the prey items observed in these two toads, it is safe to assume that the toads: 1) do not discriminate taxonomically, and 2) maybe not surprisingly, focus their attention on prey that includes poor fliers or flightless taxa. We encourage everyone to contribute to the growing database of dietary items of anurans. This work was conducted under the VDGIF collecting permit #064948. We would like to thank Art Evans and Curt Harden for their assistance on identifying the beetle specimens.

Table 1. List of invertebrate prey in two American Toads found in the City of Danville, Virginia.

Arachnida		Male	Female
Araneae			
Lycosidae		1	
Opiliones			
Cosmetidae	*Vonones ornatus*		1
Insecta			
Coleoptera			
Carabidae	**Agonum sp.*		1
Curculionidae	*Conotrachelus posticatus*	1	
Histeridae		1	
Meloidae		1	
Hemiptera			
Rhopalidae	*Boisea trivittata*		3
Hymenoptera			
Formicidae	Formicidae	6	

*****Identification of this animal was made from only a head. Curt Harden (personal communication) was sure it was a ground beetle and thought it resembled animals from the genus *Agonum*. He noted that *Agonum punctiforme* is an extremely common species that probably is prevantly consumes by toads and the head specimen matches it, at least superficially. Larochelle (1974. American toad as champion carabid beetle collector. Pan-Pacific Entomologist 50:203-204.) identified 98 species of carabid beetle in 343 toads he collected from southern Quebec. This genus is well represented in the toad's known diet.

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Hyla squirella **(Squirrel Treefrog)** VA: Gloucester County, Woodville Park (37.323318, -76.50086), 1 June 2019, James Fox and Jason Strickland.

County record: The Squirrel Treefrog in Virginia has a distribution in the southeastern corner of the state. They are found as far west as Brunswick county and as far north as King William County. Thus far, they have not been found on the eastern side of the York river, although they are known from Northampton County on the Eastern Shore. This record reports their presence in Gloucester County, on the eastern side of the York River.

We heard several Squirrel Tree Frogs and Eastern Narrow Mouthed Toads singing in the evening of 1 June 2019 at Woodville Park. The park consists of soccer fields but is bordered by mature woods, and there is also a pond nearby. This seems like a somewhat notable range expansion across the York River. A sound recording of the calls was submitted to the VHS Archive (# 561) as a voucher.

James Fox

***Hyla versicolor* (Gray Treefrog)** VA: Bland Co., Round Mountain South Fork Trail (37.168651, -81.152019) 17 May 2020. Erin Chapman and Matt Anthony.

County Record: Gray Treefrogs have scattered records throughout VA with a noticeable absence in the extreme southwestern part of the state. Records have been reported only from Giles, Montgomery, Pulaski and Smyth Counties. Bland County borders three of these that have records (Pulaski, Giles, and Smyth), which indicate a lack of surveying within Bland County, instead of an absence of the species itself. This is understandable as Bland County doesn't have many public lands, making surveying difficult. The Round Mountain trails were a happy accidental discovery on our part.

A Gray Treefrog was calling from a power line cut at 9:40am near the trail head parking area. The temperature was 24° C and very humid. A sound recording was submitted to the VHS as a voucher (Archive # 564).

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***Hyla versicolor* (Gray Treefrog)**: VA, 1420 Edley Place, Lynchburg City. 27 November 2019. Marcus Ross.

Late activity: On 27 November 2019 my children found a treefrog on the siding of our neighbor's home. The frog was a Gray Treefrog, *Hyla versicolor*, since that is the only species reported for the City of Lynchburg and surrounding areas. Cope's Gray Treefrog is not reported from our area. It was unusual the frog was out and active this late in the season. The weather had been unseasonably mild with the previous two day's daytime highs of 15 and 17°C. The weather on 27 November 2019 was rainy with a daytime high of 17°C. While records for early and late season activity are not readily available for amphibians, such data is worth reporting to begin tracking natural history related information.

Marcus Ross and Paul Sattler
Liberty University

***Lithobates sphenocephalus utricularius* (Coastal Plains Leopard Frog)** VA: Smyth County, Virginia Department of Game and Inland Fisheries (VDGIF), 1724 Buller Hatchery Road (36.7600857652738, -81.53389130719006). 17-18 June 2019. Robert A. and Sherri A. Harris

Introduced Population: The Coastal Plains Leopard Frog in Virginia, occurs in approximately the eastern half of the state. The western-most reported population is in Botetourt County.

Coastal Plains Leopard Frogs were found during a night survey at the Virginia Department of Game and Inland Fisheries' (VDGIF) Buller Fish Hatchery with the permission of the hatchery manager. These hatchery ponds are fed by the South Fork of the Holston River and empty into the Hopkins Branch before returning to the South Fork of the Holston River.

On the night of 17 – 18 June 2019, during a survey, we heard seven Coastal Plains Leopard Frogs calling and located and photographed two. The population seems to be localized to the hatchery property from the

second set of holding ponds to the Buller Fish Cultural Station building which is used to breed federally and state endangered bivalves. Since the downstream side of the Hopkins Branch is on private property, we were unable to confirm if the population has migrated outside of the hatchery. The holding ponds are ephemeral due to the hatchery emptying them October through March. Two ponds used to raise bivalves hold water all year.

This note reports the first documented sightings of the Coastal Plains Leopard Frog in Smyth County (Mitchell, J.C. and K.K. Reay, 1999. Atlas of Amphibians and Reptiles in Virginia, Special Publication No. 1, Virginia Department of Game and Inland Fisheries, Richmond, VA, 37 pp.), (Va FWIS database and Vertnet.org). There is also no record of the Coastal Plains Leopard Frog in any of the counties surrounding Smyth County. We believe the population was brought into the hatchery through delivery from an area in the eastern part of Commonwealth of Virginia. A digital photo has been deposited in the VHS archives (#553) as a voucher. We would like to thank Ryan Peaslee, Buller Fish Hatchery Manager for granting us access to the hatchery property.

Robert A. Harris and Sherri A. Harris
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***Psuedacris crucifer* (Spring Peeper)** VA: Bland Co., Camp Roland Boy Scout Camp (37.181980, -81.191119) 17 May 2020. Erin Chapman and Matt Anthony.

County Record: Spring Peepers are expected throughout Virginia, but have range gaps in random municipalities throughout the state. In western Virginia, records are lacking only in Bland, Craig and Wythe Counties. This is more reflective on lack of reporting rather than an absence of the species in those locations. Bland doesn't have many public lands, making surveying difficult.

A chorus of peepers could be heard from the road coming from the wetlands within Camp Roland Boy Scout Camp in Bland County at 8:55pm. The temperature was 21° C. A recording was submitted to the VHS as a voucher (Archive # 565).

Erin Chapman
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***Scaphiopus holbrookii* (Eastern Spadefoot)**. VA: Stafford County., 30 Viking Lane (38°27'26.48"N, 77°21'9.82"W). 29 January 2020; 38°27'17.32"N, 77°21'7.93"W 13 April 2020. Jody Partin.

County Record: The Eastern Spadefoot is a seldomly encountered frog due to its secretive nature and fossorial living style. Most spadefoots are encountered hearing males calling from vernal pools, finding individuals on the road, or accidently digging them up in soil (Gibson, J.D. and T. Anthony. 2019). Eastern spadefoots in Virginia: observations made from volunteer herpetologists around the state. Catesbeiana 39(2): 70-81). Great effort has been made recently from people around the state to fill in knowledge in the distribution gaps for this species. This field note continues that effort by recording a new county record.

On 29 January 2020, JP unearthed three adult Eastern Spadefoots from an old raised bed garden box next to her home. She took several photos of the animals and quickly buried them back in the soil where they were found. On 13 April 2020 at 1030 h JP found spadefoots .29 km south of her house in a water retention pond. At this site, JP observed many amplexed pairs of spadefoots and heard many males calling. The temperature the day preceding this observation was 22.2 ºC (72 ºF) and the late night/early morning temperature was 15.6 ºC (60 ºF). On the early morning of 13 April, a storm produced 54.9 mm (2.16 inches) of rain, which filled the water retention pond.

These observations help to fill in a gap between King George and Fauquier counties. Prince William and Spotsylvania counties to the north and south still lack voucher records. We encourage all records for this species to be published so that we can better understand this species distribution and natural history. A digital photo was submitted to the VHS archives (#567) to serve as a voucher for this record.

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***Ambystoma maculatum* (Spotted Salamander)** VA: Washington County, 6382 Rich Valley Road, Bristol. (36º 39' 16" N; 82º 14' 36" W) 17 April 2020. Roger Phelps.

County Record: The Spotted Salamander (*Ambystoma maculatum*) has a state-wide distribution in Virginia, save a couple of notable exceptions. They are not know from the eight cities/counties in the southeastern corner of the state. They are also quite sparse in the southwestern corner of Virginia, with records only from Wise, Smyth, and Wythe Counties. This report helps fill another southwestern county, Washington.

A Spotted Salamander has lived under the vapor barrier in the crawl space under our home, for at least the past two years. We have observed the same animal on several occasions during this time. The house is surrounded by a grassy lawn, but there are woods beyond the yard, with a stream on the far side of the road from our house. Several photographs of the salamander were submitted to the VHS Archive (#562) as a voucher for this record.

Roger Phelps
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***Hemidactylium scutatum* (Four-toed Salamander),** VA: Surry County, 1 mile South of the intersection of State Route 10 and State Rt. 627 and approximately 1.0 miles east of 1190 Moonlight Road (Rt. 627). NAD 1983, UTM Zone 18N, 347609.04 E, 4103450.44 N. 16 March 2010.

County Record: The range of the Four-toed Salamander is concentrated in the Coastal Plain north of the James River and scattered about the state west of the Fall Line (Mitchell, J. C., and K. K. Reay, 1999. Atlas of Amphibians and Reptiles in Virginia. Special Publication Number 1, Virginia Department of Game and Inland Fisheries, Richmond Virginia. 122 pp.). The VHS web site has it verified for the neighboring Sussex County. (https://www.virginiaherpetologicalsociety.com/amphibians/salamanders/four-toed-salamander/four- toed_salamander.php, accessed 28Dec2019)

Here I report a new county record for an adult Four-toed Salamander found south of the James River. Though not common in extreme Southeastern Virginia its range does show that the Four-toed Salamander could occur further south. The salamander was found under a 20cm diameter log that was 0.75m long in a mixed hardwood forest approximately 75m from a small unnamed tributary flowing into Pools Creek. Poor quality digital photos of the specimen have been deposited in the VHS archives #554.

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***Plestiodon laticeps* (Broad-headed Skink)** VA: Franklin County, Glade Hill (private property/residence). 13 May 2019. Aleshia Phelps

County Record: *Plestiodon Laticeps* the Broad-headed Skink is known from the eastern two-thirds of Virginia. The western-most record is in Montgomery County. An adult Broad-headed Skink was observed on an artificial rock foundation in Franklin County, (Glade Hill) on a sunny day on 13 May 2019. The rocky foundation is surrounded by various types of vegetation around the house, and a wooded area surrounds the house. This is an important submission because to date there appears to have been no other records of submission of the Broad-headed Skink in Franklin County, which is near the western-most extent of the range. It has been verified in 39 other counties in Virginia on the VHS website, including Henry and Patrick Counties to the south, and Pittsylvania County to the east. A photograph was submitted to the VHS Archive as a voucher (#551).

Aleshia Phelps
Glade Hill, VA

Chelydra serpentina (Common Snapping Turtle) VA: Wythe Co., Petunia Road (36.945802, -81.123648). 19 May 2020. Erin Chapman and Matt Anthony.

County Record: Common Snapping Turtles are assumed to be present throughout the state, but range gaps persist due to lack of surveying. In western Virginia, only Wythe, Buchanan, Roanoke and Franklin Counties lack records. Wythe County doesn't have many public ponds which results in the oversight of pond dwelling herps. Most ponds in Wythe County have to be observed from the road with binoculars.

Two individuals were observed in ponds in Wythe County on 19 May 2020. The first was in a private farm pond, but the photo was of poor quality. The second was in a pond off Petunia Road, and the photo of this individual was submitted to VHS as a voucher (Archive # 566). Both individuals were floating on the surface of their respective ponds. It was 50 degrees Fahrenheit and raining in a consistent drizzle all day. Snapping Turtles have been reported from every other county in the area, so this find fills a gap in the distribution in southwestern Virginia.

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***Clemmys guttata* (Spotted Turtle)** VA: Arlington County, location withheld. 19 April 2019. David Howell.

County Record: The Spotted Turtle is found in many counties in eastern Virginia. This report provides the first record for Arlington County. On 19 April 2019 at about noon several photos were taken from 5-6 meters with a telephoto lens, from a footbridge over a stream bank. The turtle was apparently sunning on a rocky bank.

Spotted Turtles have been reported from numerous locations in Fairfax County and Alexandria City, surrounding Arlington County, so this find is not unexpected. The photos below were submitted to the VHS Archive (#558) as a voucher.

David Howell
Arlington, VA

***Clemmys guttata* (Spotted Turtle)** VA: Northumberland County, location withheld, 11 April 2020. James Fox.

County Record: Spotted Turtles (*Clemmys guttata*) have been verified in 43 cities and counties, in the eastern half of Virginia. There is a spotty distribution with some counties having verified records and neighboring counties without records. This report fills a small gap, with a record from Northumberland County. Spotted Turtles have been verified in Westmoreland County to the north and Lancaster County to the south.

I discovered two Spotted Turtles sunning on a log in the middle of a vernal pool in the woods around noon. They were fairly small black turtles, and the glare of the sun on their shells made the spots rather difficult to discern but the yellow markings on the face and front legs were distinctive. Photographs were taken and submitted to the VHS for positive identification (Archive # 559-560). The identity was confirmed by J.D. Kleopfer (VA DGIF).

James Fox

Sternotherus odoratus **(Eastern Musk Turtle)** VA: Warren County, Front Royal Fish Hatchery (38.947984, -78.29576), 7 July 2019. James Fox.

County Record Confirmation: The Eastern Musk Turtle has a state-wide distribution, with records from 72 counties/cities. There are still counties lacking a record, and some counties, such as Warren, with just a single record. I report here a second record for the county. On 7 July 2019, I discovered an Eastern Musk Turtle sunning itself during the middle of the day in the grass near one of the fish hatchery ponds at the Front Royal Fish Hatchery. The several permanent ponds in the fish hatchery provide decent habitat so finding this species at this locality is not unexpected. The only other record for this species in Warren County is from the Smithsonian Conservation Biology Institute campus, also at Front Royal. This is a fairly widespread species in Virginia and the low number of records for many counties may be due to low survey activity rather than low population numbers. The Eastern Musk Turtle has been found in several of the counties bordering Warren, but not Loudoun, Fauquier or Rappahannock Counties to the east. A digital photograph was submitted to the VHS Archive as a voucher (#556).

James Fox

Trachemys scripta elegans **(Red-eared Slider).** VA: Albemarle County, Hollymead Lake in Forest Lakes subdivision off US 29 N. 38° 7’ 13.09” N, 78° 26’ 15.85” W. AJ Parmiter.

County Record: The Red-eared Slider is not native to Virginia, but has been widely introduced through releases from the pet industry. There are scattered records throughout the Commonwealth, often near larger cities where baby turtles were purchased in past years, then released into the wild when they reached larger size. This report is the first record of a Red-eared Slider in Albemarle County.

During a walk to observe turtles in Hollymead Lake, Red-Eared Slider turtles were observed. Based on the size, some of the Red-Eared Sliders may have been living there for some time and could be breeding. A photo showing two individuals, one significantly larger, was submitted to the VHS Archive (# 563) as a voucher for the report. The location of the observation was at the inlet on the north end of the lake from the paved path in the Forest Lakes neighborhood.

A.J. Parmeter

Farancia abacura abacura **(Eastern Mudsnake)** VA: Prince George County. 18432 Oak Ridge Lane (37° 3'17.76"N, 77°19'37.14"W). 11 June 2019. Ronald Pugh. VA: Virginia Beach. 2913 Ryan Court (36°43'46.6"N, 76°02'01.9"W). 11 May 2020. Jim Reese.

Mortality event: The Eastern Mudsnake is a nocturnal, secretive, and highly aquatic snake which can make significant terrestrial movements (Steen, D.A., D.J. Stevenson, J.C. Beane, J.D. Willson, M.J. Aresco, J.C. Godwin, S.P. Graham, L.L Smith, J.M. Howze, D.C. Rudolph and J.B. Pierce. 2013. Terrestrial movements of the red-bellied mudsnake (*Farancia abacura*) and rainbow snake (*F. erytrogramma*). Herpetological Review 44 (2): 208-213). These long terrestrial movements are responsible for high road mortality which is the source of most specimens collected for scientific investigation in Virginia (J.C. Mitchell. 1994. The Reptiles of Virginia. Smithsonian Institution Press. Washington, D.C. 352 pp.). Very little is known about this snake in Virginia. Published accounts on mortality events, other than predation and road deaths, are generally lacking in the literature (Ernst, C.H. and E.M. Ernst. 2003. Snakes of the United States and Canada. Smithsonian Books. Washington D.C. 668pp.).

The purpose of this field note is to document a previously unreported source of mortality for this species. On 11 June 2019, RP discovered a dead Eastern Mudsnake in his pool skimmer. Heavy rains occurred the night before this observation. The juvenile snake measured approximately 21.5 cm total length. The surrounding habitat is a mixed oak/hickory/pine forest. The nearest water sources are Jones Hole Swamp (1.01 km west) and Cherry Orchard Branch (1.32 km south). In addition to this observed mortality event, this represents a county record confirmation for Prince George County (VaFWIS). A digital photograph has been deposited in the VHS digital archives (# 549).

A second observation of a drowned Eastern Mudsnake in a swimming pool was made on 11 May 2020 by JR. The surrounding habitat is a wooded swamp adjacent to West Neck Creek. This is probably not that rare of an event. Figure 1 shows the housing development next to West Neck Creek swamp. At least 88 swimming pools can be counted from the small section of a satellite photograph where the drowned snake was collected. To our knowledge this represents the first time an Eastern Mudsnake has been reported to have died in a swimming pool.

Figure 1. West Neck Creek, Virginia Beach, surrounded by a golf course and housing developments.

On 14 September RP also recovered a road killed adult Eastern Mudsnake (123.4 cm total length) at the intersection of Route 156 and Lees Millpond in Prince George County. This late activity date extends beyond the 3 August late date published in Mitchell (op. cit.). He reported the activity dates for this species in Virginia as 25 May through 3 August, with one additional snake found on 27 January. Our searches through museum records (Vertnet.org and the Virginia Museum of Natural History database) did find one snake found later than our observation. This snake was found in

Chesapeake on 3 October 1963 (VMNH HERP 07176). This appears to be the latest activity date for this species in Virginia.

Being that the Eastern Mudsnake is rated as a Tier IVa species under the Virginia Wildlife Action Plan, we encourage any distributional records and natural history observations for this species to be published.

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Figure 2. Eastern Mudsnake from Prince George County.

***Opheodrys aestivus* (Rough Green Snake):** VA, Roanoke City. (-79.98497925417323, 37.24765584547713), 11 January 2020. John Franklin.

Early activity: While driving slowly through a neighborhood with my wife on 11 January 2020, the weather was unusually warm, and I saw a rough green snake sunning in a bush. This species is arboreal and typically found in bushes or trees, often bordering water (Linzey, D.W. and M.J. Clifford, 1981. Snakes of Virginia. University Press of Virginia, Charlottesville, VA). It is found throughout Virginia, although not frequently in the western mountains. They are insectivorous and feed on the insects which themselves are feeding in the shrubs in which they are often found. The location and microhabitat are not unusual. However, 11 January is very early in the year for normal activity. The temperature was unusually warm (about 16ºC) for January, so this specimen was most likely out from hibernation taking advantage of the warmth to bask in the sun for a bit. The earliest activity record in Mitchell (J.C. 1994. The Reptiles of Virginia. Smithsonian Institution Press, Washington D.C.,352 pp,) from museum specimens is 6 April. Werler and McCallion (1951. Notes on a collection of reptiles and amphibians from Princess Anne County, Virginia. Amer. Midl. Nat. 45:245-252.) report they found the rough green snake during every month of the year except December, January and February. Clifford (M.J. 1976. Relative abundance and seasonal activity of snakes in Amelia County, Virginia. Virginia Herpetological Society Bulletin 79:4-6.) reports the activity period as May-September. From these sources, it appears the earliest activity would be from southeastern Virginia (Werler and McCallion, op. cit.) in March. This observation would thus be the earliest activity report for Virginia. A shed snake

skin was found in the lower branches of the bush in which the Rough Green Snake was observed, indicating it may have shed just prior to the observation of basking. Keels were obvious on the shed, confirming that this snake was indeed *Opheodrys aestivus*. Photos were taken of the snake and the shed, as vouchers, and sent to the VHS (Archive # 563).

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Roanoke, VA 24018

***Pantherophis guttatus guttatus,* (Red Cornsnake).** VA: Appomattox County. Appomattox-Buckingham State Forest. (37.423836020788, -78.681967863886). 30 March 2020. David Deem and Charles Baker.

County Record Confirmation: On 30 March 2020 Charles Baker and I were out herping in the Appomattox-Buckingham State Forest when we came across a Red Cornsnake under a pine log. While neither the VHS website or the Virginia Department of Game and Inland Fisheries FWIS database lists the Red Cornsnake for Appomattox County, there is a record of a juvenile from 1984 in the Smithsonian Museum (#516393). This record thus serves to confirm that find with an adult specimen. Cornsnakes are known from many of the surrounding counties, including Buckingham and Nelson to the north, and Amherst and Campbell to the west, but not Charlotte or Prince Edward to the east. The weather was slightly overcast and in the low 60's (15-20^{o} C) when this animal was found. A photograph was submitted to the VHS Archive (#550) as a voucher.

David A. Deem
9814 Sudley Manor Drive
Manassas, Virginia 20109

***Regina septemvittata* (Queensnake).** VA: Clarke County. Shenandoah University Cool Springs Campus, where stream from Raven Rocks Hollow enters the Shenandoah River 39°08'43.4"N 77°51'46.0"W. 03/31/2020. Lillian Ledford.

County Record: The Queensnake has been reported in all Virginia counties surrounding Clarke County (Frederick, Warren, Fauquier, and Loudoun), but not from Clarke. During water quality testing, a Queensnake was spotted partially under a rock in a stream from Raven Rocks Hollow approximately 4 m from where it enters the Shenandoah River. The day was cool (approximately 15ºC, 60ºF) and overcast. During the water quality testing, four crayfish were found, ranging in size from 1 to 3 inches , indicating an abundant food supply is available. This new record fills a gap in the distribution of the Queensnake in northern Virginia. A digital photograph was submitted to the VHS Archive (# 555) as a voucher.

Lillian Ledford
Berryville, Virginia

***Storeria dekayi* (Dekay's Brownsnake)** VA: Buckingham Co., 437 Wildflower Lane, Dillwyn (37°24'59.1"N 78°26'17.2"W). 9 March 2020. C. Michael Stinson.

County Record: Although Dekay's Brownsnake is widespread in central and eastern Virginia, records are still lacking from several counties in these areas. Neither the VHS web site, the DGIF FWIS database, or Vert Net contain a record of Dekay's Brownsnake for Buckingham County, although a "Research Grade" record for Buckingham from 24 Oct 2017 was available on iNaturalist (https://www.inaturalist.org/observations/9946051). The species is known from all counties adjacent to Buckingham, except Appomattox to the south, so this report confirms that Buckingham County is not a lacuna in the known range of the species.

At about 5:20 pm EDT on 9 March 2020, I noticed one of these snakes on the sidewalk leading to my house. I took pictures of it with my phone and watched it for several minutes while it barely moved. I left the snake alone for about 45 minutes, then returned to find that it had moved about 30 cm. I took more pictures with a DSLR camera, including one submitted with this note as a voucher (VHS Archive # 552). The images show characters typical of the species including the generally gray-brown and brown coloring; two rows of dark spots on the dorsum; keeled dorsal scales; a dark streak on the side of the head behind the eye; and the blunt head shape. By photographing the snake alongside a tape measure I was able to estimate its size at >310mm total length. The weather on the day of the observation had been warmer than average, with clear skies; a high temperature of 21° C (70° F) had been recorded at the Farmville airport (6.6 km south) and the temperature was 19° C (67° F) when the snake was found. There had been no

precipitation for more than 10 days prior. This appears to be a relatively early date for the species in Virginia, though it has been recorded every month of the year (https://www.virginiaherpetologicalsociety.com/reptiles/snakes/northern-brownsnake/northern_brownsnake.php, 10 March 2020). When I looked for the snake again a short time after sunset, it had disappeared, and it was not seen again subsequently. While this species is known to eat terrestrial gastropods, and I have often seen slugs and snails in a flower bed less than 1 m from where I found this individual, I had never seen this species here despite living at this location for more than 17 years.

C. Michael Stinson
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Keysville, VA 23947

***Storeria o. occipitomaculata, (*Northern Red-bellied Snake)** VA: Sussex county. Piney Grove Preserve 20 April 2020. (36.980170, -77.050488), David Deem and Charles Baker.

County Record: The range of *Storeria occipitomaculata*, the Northern Red-bellied Snake, is most likely state-wide. There are some areas where records are scarce, the most notable in southwest Virginia where there are only two counties (Scott and Dickenson) with verified records. Since this is a small, nocturnal snake which spends much of its time under cover (Mitchell, J.C. 1994. The Reptiles of Virginia. Smithsonian Institution Press, Washington D.C. 352 pp.) it's scarcity is most likely due to its small size and behavior rather than its actual distribution. A smaller gap in the distribution is found in southeastern Virginia where there are no records for Brunswick, Dinwiddie, Greensville, Lunenburg or Sussex Counties.

This record helps fill the gap in southeastern Virginia by providing a voucher for Sussex County. This species has been found in neighboring Southampton County to the south, Surry to the east, and Prince George to the north. The specimen was found under natural debris by myself and Charles Baker on 20 April 2020. It was raining and about 17^{o}C when this animal was found. A digital photograph (#557) was submitted to the VHS as a voucher.

David A. Deem
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Tantilla coronata (Southeastern Crowned Snake). VA: Bedford Co., Smith Mountain Lake (locality information intentionally withheld) 9 April 2020. Timothy Brust, Jacob Miller.

County Record: One adult *T. coronata* was observed at 1300h on 9 April 2020 in Bedford County, Virginia, near Smith Mountain Lake, USA (locality information intentionally withheld, per JD Kleopfer's request). The snake was found in a south facing pile of flat rocks on the edge of a powerline right of way (ROW) adjacent an ephemeral stream. No morphometric data were collected. The ROW was predominately grassland interspersed with young conifers such as Eastern red cedar (*Juniperus virginiana*). Mature hardwood forest interspersed with conifer trees flanked the sides of the ROW. Weather during the observation consisted of a mostly sunny sky, a temperature of 18° C (65° F), and periodic gusts of strong wind. A juvenile *Lampropeltis elapsoides* (Scarlet Kingsnake) was found less than one meter (3.2ft) away from the *T. coronata.* According to the Virginia Herpetological Society database, this is the first recorded *T. coronata* found in Bedford County, Virginia. This individual was found near the Pittsylvania County line close to the Blackwater River. *T. coronata* have been found in all counties adjacent Pittsylvania County except Bedford County, until now. A digital photograph was deposited with the VHS Archive (#568) as a voucher.

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Resolved case of suspected ophidiomycosis in a juvenile ratsnake (*Pantherophis alleghaniensis*). VA: Fairfax County, Westerholme Way (38.9222 N, 77.26083 W). 23 November 2018. Lauren D. Fuchs, Coline C. Hay, Todd A. Tupper.

Ophidiomycosis: Ophidiomycosis formerly known as snake fungal disease, is an infection in snakes caused by the keratinophilic fungus *Ophidiomyces ophiodiicola* (*Oo*; Lorch et al. 2015. Experimental infection of snakes with *Ophidiomyces ophiodiicola* causes pathological changes that typify snake fungal disease. American Society for Microbiology 6: e01534-15). Manifestation of ophidiomycosis in North American colubrid snakes is variable, with cases ranging from mild dermatitis to severe systemic infections, including pneumonia (Allender et al. 2015. The natural history, ecology, and epidemiology of *Ophidiomyces ophiodiicola* and its potential impact on free-ranging snake populations. Fungal Ecology 17: 187-196). While severe cases frequently result in mortality (Lorch et al. 2016. Snake fungal disease: an emerging threat to wild snakes. Philosophical Transactions of the Royal Society B 371:20150457), most *Oo* infections are limited to the epidermis and may be cleared through molting (Campbell. 2017. Snake fungal disease monitoring report for Tennessee: Wildlife Technical Report 17-4). Molting is likely an important immune response to infection as it occurs with greater

frequency in infected snakes. By ridding necrotic tissue and fungal elements, molting may allow snakes to effectively clear *Oo* infections, especially when limited to the upper epidermis (Lorch et al. 2015. Experimental infection of snakes with *Ophidiomyces ophiodiicola* causes pathological changes that typify snake fungal disease. American Society for Microbiology 6: e01534-15). Here, we report a case of ophidiomycosis in an eastern ratsnake (*Pantherophis alleghaniensis*), which was effectively cleared through a single molt.

On 23 November, 2018, we received a juvenile eastern ratsnake that was captured from a concerned citizen's residential basement in Vienna, Virginia. Upon inspection of the snake, we observed numerous ventrolateral lesions and hyperkeratosis of the ventral scales and cloacal plate. Suspecting ophidiomycosis, we sampled the snake's skin with sterile dry swabs. We later performed a qPCR analysis on the samples (4 December 2018) and confirmed the presence of *Oo*. We then brought the snake to Dora Kelley Nature Park (Alexandria City, Virginia) where it was housed in a sanitized, temperature-controlled (24-29.5 ˚C) terrarium. On 29 November 2018, the snake ate a pinky mouse, and later produced seemingly normal excrement. On two occasions prior to its first molt, we placed the snake in a diluted povidone-iodine solution for approximately 20 minutes. We observed ocular cloudiness on 6 December 2018 and the snake subsequently molted on 9 December 2018. Most lesions resolved after the molt. We re-sampled the snake (post-molt), and its shed skin for *Oo* on 21 December 2018. Only the shed skin tested positive in the subsequent qPCR analysis (conducted on 24 January 2019). Following molting, we disinfected the snake's enclosure and water dish with a 10% bleach solution, disposed of hides, and replaced the substrate (Zoo Med EcoEarth). An additional shed was sampled and analyzed via qPCR (conducted on 5 March 2019). This sample was negative for *Oo*. Currently, the snake has no visible lesions, accepts pinky mice every 7-10 days, and has maintained steady growth and consistent molts.

Our observations support the documented effectiveness of molting as an important immune response to infection (Lorch et al. 2016. Snake fungal disease: an emerging threat to wild snakes. Philosophical Transactions of the Royal Society B 371:20150457). This case also highlights the potential value of ex-situ treatment of ophidiomycotic snakes by qualified individuals. Ideal husbandry conditions, such as consistently warm temperatures and frequent feedings, may facilitate an improved immune response and shorter molting intervals in species/individuals that do not demonstrate a heightened and lasting stress response to captivity (Lorch et al. 2015. Experimental infection of snakes with *Ophidiomyces ophiodiicola* causes pathological changes that typify snake fungal disease. American Society for Microbiology 6: e01534-15). Based on our observations and prior work (Mccoy et al. 2017. Environmental and physiological correlates of the severity of clinical signs of snake fungal disease in a populations of pigmy rattlesnakes, *Sistrurus miliarius*. Conservation Physiology 5(1): cow077), we recommend that qualified individuals work with state biologists and consider ex-situ treatment as an option for treating some cases of ophidiomycosis.

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Survey of Daniel Island. VA: City of Lynchburg. Forested island in the James River with vernal pools. (37.42993333° N, -79.14520766° W). 31 March 2019. Hannah Kinsley, Liam Cusack, and Erika Stroh.

Survey: On 31 March 2019, a BioBlitz was conducted on Daniel Island to assess the wildlife on the island and to characterize the dimensions of any vernal pools. A 3-member team, consisting of Liam Cusack, Erika Stroh, and Hannah Kinsley, worked from the upstream point of the island to the downstream point. The objective of this survey was three-fold, catalog all animals found on and around the island, look for vernal pools and characterize them, and test amphibians for *Rana* virus. This report details the amphibians and reptiles found during this survey. All herps found were on the Lynchburg side of the island, none were noted on the Amherst County side. Logs and rocks were overturned in the search. During the terrestrial search, the only animal found was one *Notophthalmus viridescens* in the Red Eft life stage. There were 3 vernal pools, one of which dried up within a week of its discovery. Using dip nets and seines, the team was able to search the pools for amphibians.

In these pools, *Ambystoma maculatum*, *Anaxyrus americanus*, and *Lithobates palustris* egg masses were found. Adult *Notophthalmus viridescens*, *Anaxyrus americanus*, and *Lithobates palustris* were also found, as well as one *Chelydra serpentina* and three other turtles that could not be identified. Water delineations were conducted on two of the three pools. GPS coordinates were taken around pools edge and later mapped using QGIS. The length and width of each pool was measured as well as the depth to create a contour map of the pool's floor. Amphibians found were swabbed using sterile field methods and plated to identify microbiomes present on the skin. Swabs were also collected to test for Rana virus. The results came back negative. Although no new records were discovered, this is the first systematic survey of Daniel Island in the James River at Lynchburg.

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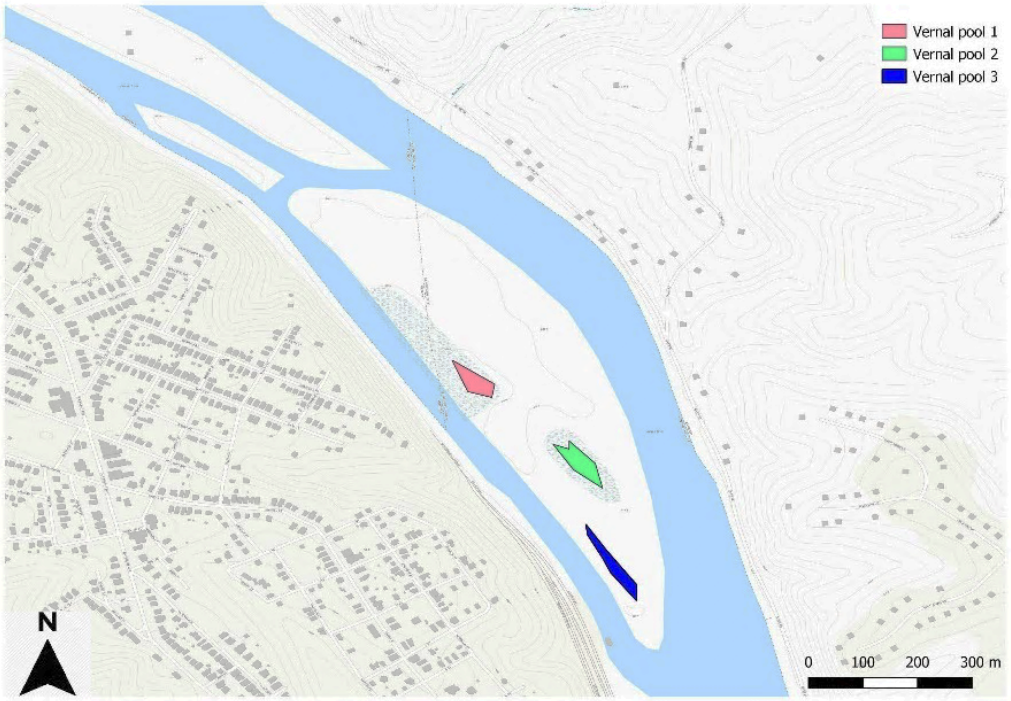

Figure 1. Daniel Island with location of three vernal pools.

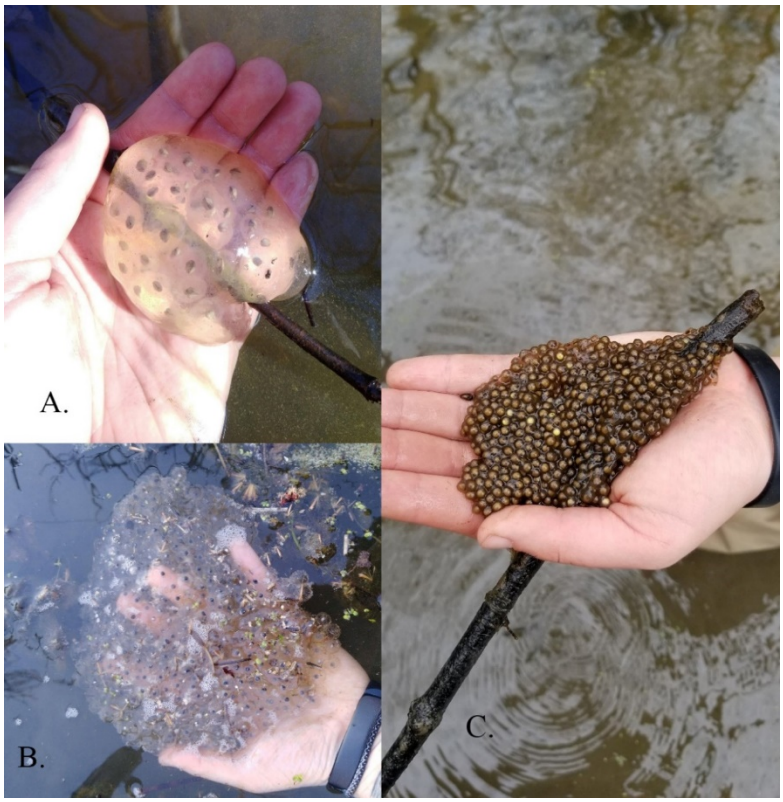

Figure 2. The egg masses found were photographed and identified as: A. *Ambystoma maculatum*, B. *Lithobates sylvatica*, and C. *Lithobates palustris.*

Recent Literature of interest to Virginia Herpetologists:

Bogart, J.P. 2019. Unisexual salamanders in the genus *Ambystoma*. Herpetologica 75(4):259-267.

Bruce, R.C. 2019. Life history evolution in Plethodontid salamanders and the evolutionary ecology of direct development in Dusky salamanders (*Desmognathus*). Herp. Review 50(4):673-682.

Brust, T.J. et al. 2020. Diadophis punctatus edwardsi, coloration (axanthism). Herp. Review 51(1):142.

Button, S.K. 2019. *Plethodon dixi*: Habitat. Herp. Review 50(4):756.

Carrasco-Harris, M.F. et al. 2010. Population genetics of Copperheads (*Agkistrodon contortrix*) within an urban forest. Herp. Review 51(1):1-7.

Caruso, N.N. and L.J. Rissler. 2019. Museum specimens reveal life history characteristic in *Plethodon montanus*. Copeia 107(4):622-631.

Da Silva, J.G. et al. 2019 Life-stage differences in microhabitat use by Hellbenders (*Cryptobranchus alleganiensis*). Herpetologica 75(1):21-29.

Devos, T. 2019. Chelydra serpentine: Feeding Behavior. Herp. Review 50(4):767-768.

Dillon, R.M. et al. 2020. Build it and some will use it: A test of road ecopassages for Eastern Garter Snakes. J. Herp. 54(1):19-23.

Ellison, A. 2010. Bd-exposed salamanders experience temperature-dependent immune responses. Herp. Review 51(1):197.

Gibson, J.D. and R.L. Hoffman. 2019. Prey of American Bullfrogs (*Rana Catesbeiana*) from Henry and Patrick Counties, Virginia (Anura: Ranidae). Banisteria 52:37-41.

Goodlett, C. and B. Stephenson. 2019. Body color and morphological correlates of fitness in Eastern Fence Lizards (*Sceloporus undulates*): A Spectro photometric approach. Herpetologica 75(1):69-78.

Greenwald, K. et al. 2020. Phylogeographic analysis of Mudpuppies (Necturus maculosus). J. Herp. 54(1):78-86.

Hecnar, S.J. et al. Clutch size in *Plestiodon fasciatus* near its northern range boundary and variation across the species range. Herp. Review 50(4):712-717.

Hill, J. et al. 2019. *Lithobates catesbeianus*: diet. Herp. Review 50(4):761.

Hillis, D.M. 2020. The detection and naming of geographic variation within species. Herp. Review 51(1):52-56.

Homan, R.N. 2019. Climate-related correlates of several metrics of breeding phenology in a spotted salamander (*Ambystoma maculatum*) population in Ohio. J. Herp. 53(4): 257-262.

Lawson, L. 2019. *Storeria dekayi*: Defensive behavior and predation. Herp. Review 50(4):812-813.

Mantzouris, K. et al. 2010. Confirmation of successful brumation of Eastern Box Turtles (*Terrapene carolina carolina*): a comparison of translocated vs. resident turtles through incidental encounters in and around the Maryland Zoo in Baltimore. Herp. Review 51(1):20-23.

Marchand, M.N. 2019. Chrysemys picta: Predation. Herp. Review 50(4):770-771.

McAllister, C.T. 2010. Chelydra serpentine (Snapping Turtle) diet. Herp Review 51(1):107-108.

McLeod, D.S. et al. 2020. *Carphophis amoenus* distribution, Giles County, Virginia. Herp. Review. 51(1):77-78.

Moore, J. 2010. Book Review: Pingleton, M. and J. Holbrook 2019. The Field Herping Guide: Finding Amphibians and Reptiles in the Wild. Univ. GA Press, Atlanta, GA 253pp. in Herp. Review 51(1):164-166.

Moore, J.A. 2020. Nest-site fidelity and sex-biased dispersal affect spatial genetic structure of Eastern Box Turtles (*Terrapene carolina carolina*) at their northern range edge. Copeia 108(1):19-28.

Oxenrider, K.J. et al. 2019. Influence of bait type on capture success of *Clemmys guttata* and *Chrysemys picta* using small hoop nets in shallow wetlands. Herp. Review 50(3):490-492.

Palis, J.G. and M.B. Roehler. 2019. *Plethodon dorsalis*: predation. Herp. Review 50(4):756-757.

Palis, J.G. 2019. *Scaphiopus holbrookii* and *Hyla chrysoscelis*: Interspecific amplexus. Herp. Review 50(4): 764-765.

Patton, A. et al. 2019. A new Green Salamander in the southern Appalachians: Evolutionary history of *Aneides aeneus* and implications for management and conservation with the description of a cryptic mocroendemic species. Copeia 107(4):748-763.

Petersen, C.E. et al. 2019. Sex, mass, and monitoring effort: Keys to understanding spatial ecology of Timber Rattlesnakes (*Crotalus horridus*). Herpetologica 75(2):162-174.

Sattler, P.W. and T.R. Brophy. 2019. Distribution, hybridization, and taxonomic status of Two-lined salamanders (*Eurycea bislineata* complex) in Virginia and West Virginia. Banisteria 52:28-36.

Selman, W. 2019. Malaclemys terrapin: Kyphosis and Lordosis. Herp. Review 50(4):774-775.

Schneider, A.C. et al. Annual and diel activity of spiny softshell turtles (*Apalone spinifera*) and snapping turtles (*Chelydra serpentina*) in an urban Minnesota lake. Herp. Review 50(4):709-712.

Stemle, L. et al. 2019. Spatial ecology of the Striped Mud Turtle, *Kinosternon baurii*, in a restored Florida wetland. Herp. Review 50(4):695-698.

Joseph C. Mitchell (1948-2019)

We reported in the Fall 2019 Catesbeiana the tragic death of Joseph C. Mitchell. Since then, several obituaries have been published. Rather than repeat one here, we refer you to those already in print.

Dodd, C.K. Jr. 2019. Joseph Calvin Mitchell (1948-2019): Natural Historian, Turtle Enthusiast, Marine, Virginian. Herp. Review 50(4):889-893.

Hilton, E.J. et al. 2020. Joseph C. Mitchell (1948-2019): Herpetologist and Natural Historian of the Old Dominiom. Copeia 108(1):188-194.

Roble, S.M. 2019. Joseph C. Mitchell, Obituary. Banisteria 52: 52-73.

President's Corner

Hello fellow herp enthusiasts,

This has so far been an eventful year for all of us in so many ways due to the COVID-19 pandemic. I want to first give my sincerest hope that you and your loved ones are healthy and making the best of these times. We must continue to heed the directions and advice of scientists and healthcare professionals that are fighting this new virus with everything they have, and the best help that we could give them is to limit its spread. The direct impact to our organization has been an abrupt stop to all activities that include being in close contact with people, such as all of our scheduled educational events and surveys. I sorely miss seeing all of you at these events, and it has been difficult to cancel them, albeit for our health and safety.

So now for some positive news. We are still planning to hold our annual business meeting using online technology, and there have been many new and creative ideas of how we can still get you educational content and how we will proceed in the near future. Once these ideas have been discussed and planned, we will communicate that information to you via social media and email to keep everyone in the loop and in a timely fashion.

The other bit of good news is that you are still allowed to get outside for fresh air and exercise if you follow those social distancing guidelines (stay home if sick, stay at least six feet away from other people, wear a mask if you have to be near people, cover your mouth and nose if you cough or sneeze, wash your hands often). I have been able to go out to local parks often with my five-year-old son, and we have spent a lot of quality time together. It has been so heartening to see other folks go out and experience their local parks. If you do go out, please set a good example and adhere to those social distancing guidelines and respect the environment as well as our wildlife.

Stay well and be safe,
Travis Anthony
VHS President

Virginia Herpetological Society
Virtual Spring Business Meeting 6/7/2020
Minutes of Meeting

Travis Anthony, President of the Virginia Herpetological Society (VHS), opened the meeting at approximately18:07 h. EDT and provided the agenda for the meeting. VHS and VHS Executive Committee Members (Ex-Com), Yona Britto, Erin Chapman, Mike Clifford, Matt Close, Jason Gibson, Bonnie Keller, Mark Khosravi, Nell Koneczny, Larry Mendoza, Dave Perry, Mike Salotti, Paul Sattler, Caroline Seitz, Kory Steele, Susan Watson and John White also participated in all or part of the meeting.

Old Business

1. New County Records

Erin Chapman, VHS Vice President, went through GBIF records of all Virginia snake observations to determine if any new county records from this independent source could be added to the VHS herpetological data base. Paul Sattler, VHS Journal Editor, recommended that these records should be sent directly to VDGIF for inclusion in their data base. Susan Watson, VHS Permits Chair, indicated that VDGIF documentation requirements would need to include photo verification of the species, GPS coordinates or other location verification, observer name and contact details. John White, VHS webmaster, requested that Susan Watson update the VHS data base with VDGIF county records. Susan agreed but indicated she is still trying to catch-up on this effort.

2. VHS Donations

Mark Khosravi, VHS Advisory Committee Member, asked if there had been any donations picked-up from local customers he had served (when requested to do a snake removal, Mark suggests donations to VHS in lieu of payment). Matt Close, VHS Treasurer, indicated that VHS had received several donations. However, the sources could not readily be identified. There was one donation of $250 from a business, possibly a tax write-off.

Committee Reports

1. Catesbeiana

Paul Sattler indicated that the Spring edition of Catesbeiana was in the final stages of formatting and should be ready formatting and should be ready for publication in 1-2 weeks. This edition should be substantial. However, with the cancellation of field surveys for 2020, the next Fall and Spring editions will be light on survey reports as only the 2019 Sky Meadows Survey report is not yet complete. Those editions will need to rely heavily on Field Notes.

2. Newsletter

Bonnie Keller, VHS Newsletter Editor, apologized for missing the target deadline for the Spring Newsletter. The last VHS Newsletter was published in the Spring of 2019. Bonnie indicated that she had sufficient material to assemble and publish the VHS Newsletter within a few days. However, VHS Ex-Com had in the past developed a policy of spacing the publication of Catesbeiana and the VHS Newsletter and it was agreed that the target date for the next issue should be August 1, 2020.

3. Education

Mike Clifford, VHS Education Committee Chair, indicated that the Covid 19 pandemic had a negative impact on education and tabling events in 2020. The last training session was provided by Mike to Master Naturalists at Pocahontas State Park in March. Since then all education and tabling

events have been either postponed or cancelled. It is not yet clear what will happen in the second half of 2020. However, Herp ID and general information requests have increased significantly, with more than 400 this year. Several meeting participants indicated 400 is probably an undercount as Facebook and Virginia Wildlife Group ID requests are also way up. Mark Khosravi indicated that wildlife removal requests have also increased significantly and that he was involved in a level 1 class for non-venomous amphibian/reptile removal. Many speculated that increased outdoor activity due to Covid 19 restrictions may be the reason for these increases. Mike reported that he had received a photograph from a fishing couple in Brunswick County that appeared to be a Cottonmouth. This could be a new locality for this species within Brunswick County, further north than previously documented in the county. Mike reminded everyone to submit their future education efforts to him for inclusion in the annual Education Committee report published in October for the Fall Meeting.

4. Surveys

Jason Gibson, VHS Survey Committee Chair, said there is nothing to report for 2020 as all VHS surveys for the spring of 2020 were cancelled. Jason indicated the Hep/Blitz will be re-scheduled for Northwest River Park for the first or second week of June 2021. Travis Anthony indicated that VHS was again welcome to survey Pocahontas State Park in 2021 and he is also considering a survey of Prince William Park in 2021.

5 Online Store

Nell Konecnzy, VHS Online Store Manager, indicated that Café Press is not frequently used. Most of the purchases are t-shirts and the rest of the options are not frequently purchased. However, not much progress has been made yet to find an alternative to Café Press. To get the process moving Nell recommended a massive t-shirt buy for VHS members. This would be a pay option. Bonnie Keller suggested there could also be interest in bumper stickers. Nell agreed to get a t-shirt order form out to membership by the end of the week. The t-shirt buy would not replace the need for a new Online Store. Since Café Press has not served VHS very well Nell suggested she would finalize another Online store option for Ex-Com consideration by the end of August. Bonnie Keller suggested the magnets should be included in any future on-line product offering.

6. Treasurer

Matt Close, VHS Treasurer, presented the treasury report and cash balance effective today. The total balance is $19,447.97. However, there is a $500 research grant check that has not yet been cashed, leaving net funds total of $18,947.97. Of this amount $6,096.37 is locked into a certificate of deposit which matures in September. Membership dues since the last report are $3,787.00. Other revenue sources include Amazon Smile Commissions of $172.15 and donations of $565.00. Total VHS membership is 338 which includes 255 regular, 12 student and 71 lifetime members. Mike Salotti, VHS Outreach Committee Chair, indicated there might be 1-2 additional membership applications not yet included in the totals. Total membership appeared to decline by 9 between 2019 and 2020, although there may some redundancy in the membership figures due to the automatic subscription renewal of some PayPal payments. Matt Close suggested there was some surprise and disappointment with PayPal automatic renewal charges with some members who may have believed they were only signing up for one year. Some members noted the increasing VHS cash balance and

the need to develop responsible spending plans relative to future anticipated revenues. Some ideas included a one-time gift of free t-shirts to members, community engagement gifts such as snake hooks for kids, herp flyers for specific geographic regions etc., but no decisions were taken. Dave Perry, VHS Secretary and Conservation Committee Chair suggested that with the current low interest rate environment, it might be prudent for VHS to roll the CD into the current VHS account. After a lengthy discussion, the Ex-Com voted to terminate the CD in September and roll the balance into the current VHS account. Matt Close would seek better promotional CD rates thereafter.

7. Secretary/Conservation

Dave Perry mentioned that the Conservation Committee survey planned for 2020 had been cancelled along with the other VHS spring surveys. However, the management of Chippokes Plantation State Park expressed a desire to reschedule the survey for the spring of 2021.

8. Outreach

Mike Salotti announced that he has resigned as VHS Committee Chair. Mike indicated there are problems issuing VHS membership cards in a timely manner. Some of the issues are with PayPal payments which are often gifted by the account holder to another individual. Matt Close suggested that many members do not consider a PayPal receipt as evidence of membership and with more than 300 VHS members, management of membership cards is a very tedious process and is too much of a burden when combined with the treasury duties. That is why the Outreach Committee was recruited to perform the function. Mike Salotti suggested that development of a Splash page might help automate the process but John White, VHS Webmaster mentioned that a Splash page has been ready to go for 6 months. Bonnie Keller suggested that it should be possible to illustrate a membership certificate on a computer screen at the time of payment which could be printed and agreed to investigate potential options. Dave Perry volunteered to take over the membership card issuance if an automation alternative cannot be developed. Kory Steele, VHS Grants Chair, suggested limited VHS membership benefits might not justify the need for VHS membership cards.

9. Permits

Susan Watson, VHS Permits Chair, mentioned that the Exhibitors Permit has been issued. The Scientific Collections Permit is ready to be issued with all the surveys identified for the spring of 2020 included with a date to be determined designation (TBD) and could be revised for use once a final date is established, perhaps as early as the fall of 2020. Bonnie Keller questioned whether the Exhibitors Permit or local ordinances would govern the exhibition of venomous snakes. Susan indicated that there was no state regulation against the exhibition of venomous snakes but was unsure about local ordinances and agreed to investigate the issue.

10. Website

John White provided a graphical presentation of the VHS Website Report. A year to date comparison of May 2020 to May 2019 shows unique visitors increased from 124,272 to 171,746, number of visits increased from 162,408 to 236,087, number of pages increased from 295,560 to 403,877, the number of hits increased from 12,616,762 to 20,085,808 and bandwidth was increased from 1,654.25 to 2,410.13 GB. The added 0.7 GB of new content included VHS generated county maps for the species pages, U.S. range maps for snakes and lizards, educational graphics, additional specimen photos and a new page for the recently

discovered (rediscovered) Blacksburg Salamander (*Plethodon jacksoni*). Pages for the Yellow-spotted Woodland Salamander (*Plethodon pauleyi*) and the Dixie Caverns Salamander (*Plethodon dixi*) are being developed. Bonnie Keller mentioned that Sean Bush of "Venom ER" tv series fame is impressed with the VHS website. Matt Close mentioned that the VHS website is always one of the first sites that appears when herps of the southeast are searched on the internet. Kory Steele suggested this may be why VHS receives so many out of state herp ID requests.

11. Grants

Kory Steele suggested he would make a stronger attempt to advertise the VHS Research Grant opportunity late in 2020 in order to generate more grant proposals for 2021 (both research and non-research grants). VHS approved only 2 research grant requests in 2020. Bonnie Keller offered to highlight the VHS Grants program to the Virginia Association of Science Teachers of which she is a member. Some members asked if grants could be applied to habitat restoration projects. Kory indicated that it might be possible for killing field fencing to redirect turtles for example. Eagle Scout projects were also suggested as a possibility. Kory indicated that VHS needs to be accountable to its 501c requirements and will always need some type of proposal which would include background on the person making the proposal and their research plan.

12. Regulatory

Larry Mendoza, VHS Regulatory Affairs Chair, reported that most of his effort since the Fall 2019 meeting was involved with the VDGIF Wildlife Viewing Advisory Committee. This group has been establishing general values and objectives and developing SMART goals for each objective. VDGIF will be renamed the Department of Wildlife Resources which Susan Watson confirmed will become effective July 1, 2020. The plan is to make wildlife management areas more amenable for wildlife viewing (not just for fishing and hunting). The committee meets every other Thursday for about four hours. Larry will share the results and progress of this effort via email with the Ex-Com. Some interest was raised in the potential new regulation concerning native species limits for personal use. Currently, up to 5 specimens of non-protected species may be held per person. J.D. Kleopfer, Herpetologist for the Commonwealth of Virginia, has indicated some individuals are abusing this limit by collecting more than 5 specimens in the name of disinterested family members to boost the size of their personal collections. New proposed regulations will be developed after July 1 with a 30-day public comment period prior to implementation. Susan Watson indicated that Woodland Box Turtles and Timber Rattlesnakes would be banned from future collections. Species limits might be reduced to 1 per household, but current native collections would probably be grandfathered, there would be an education exemption, etc. Until a written regulation is published it is unclear how native species collections will be limited. However, it remains illegal to transport native species across state lines.

New Business

1. VHS Google Ex-Com contacts

Travis Anthony pointed out that there are two Ex-Com email contact lists which has led to some miscommunication and the inaccurate and obsolete email list will be removed from Gmail.

2. Outreach Committee

Travis Anthony introduced Yona Britto who will work with Mike Salotti and Matt Close and transition to VHS Outreach Committee Chair.

3. Facebook
Kory Steele indicated that some Facebook herp ID requests were being sent to various members for quicker response time. However, many would not follow-up with this request so some ID requests never had a response. Yona Britto volunteered be added to the Facebook herp ID effort.

4. Fall Surveys, Fall Business Meeting Location
Matt Neff, VHS Past President, was unable to attend the meeting but reported to Travis Anthony that he would plan a Fall survey at Lake Anna State Park if VHS re-opens surveys in the Fall. For the Fall Meeting, VHS will adopt a wait and see approach. Phase 2 reopening would allow up to 50 people to attend a conference. One issue might be how to limit group size. It may also be possible to consider an outside venue.

5. Independent Coordinated Surveys
Erin Chapman presented an idea developed by Louisiana Amphibian and Reptile Enthusiasts for remote independent coordinated surveys that would entail individuals signing up to field survey specific areas on a specific date and report back their results at the end of the day. There would be online herp ID support. In this way surveys could be done with social distancing to avoid the spread of Covid 19. The survey results would not be published but it could be a way to keep VHS membership engaged. After some discussion Erin agreed to schedule two independent VHS survey events, one in July and August.

6. Herp Videos, ADA Compliance, Accessibility of VHS Events
Larry Mendoza asked Nell Koneczny, who has experience as an accessibility professional, to explain some potential opportunities for VHS to improve its accessibility for disabled persons such as those who are deaf or are have difficulty seeing. Some suggestions included implementing Website Compliance Accessibility Guidelines (WCAG) for the VHS website over time and possible captioning for future VHS events like the Fall Meeting. VHS field surveys are interesting but not practical for some disabled people (including Nell). The general idea is to be more inclusive to new communities of potential members who are disabled but interested in herpetology. Larry, Nell and Erin recently participated in a presentation at Virginia School for the Deaf and received an enthusiastic response. Mike Clifford mentioned that VHS has in the past held special surveys for children as part of the Spring Survey in less challenging environments which is a similar idea. Nell had recently coordinated Reptile Show Vid 19 with captions over two days. She hired a captioner for nine hours at a total cost of $1,890. However, she knows a more reliable and less costly captioner. This was a popular event and a similar but shorter video could be arranged for VHS and native Virginia herp species in the future. There is no specific request at this time to the Ex-Com, but an effort will be made to develop a couple of manageable near term goals. Erin Chapman and Larry Mendoza agreed to assist Nell in this effort.

7. Membership Benefits, iNaturalist
Erin Chapman attempted to negotiate registration discounts for VHS members attending the 2020 Joint Meeting of Ichthyologists and Herpetologists (JMIH) with disappointing results. Erin will try again for the 2023 JMIH conference.
Catesbeiana is no longer exclusively available to VHS members and can no longer be considered a benefit. There was some discussion about returning to the past practice of distributing Catesbeiana to VHS members several months prior to posting to the VHS website. However, with the issues

surrounding timely notification of new memberships/membership renewals, this past practice does not seem to be workable. It was agreed to remove Catesbeiana from the list of membership benefits. Erin went through the remaining list of membership benefits for group comment. The VHS Newsletter (when published) is an obvious member benefit as is access to the most prominent and authoritative herpetologists. Erin reviewed the list of VHS institutional admissions discounts. Caroline Seitz, VHS Advisory Committee Member, mentioned that she no longer owned her previous business "Reptiles Alive" but would commit to a VHS discount for her new business "Kids Nature Shows". It was unclear if previously negotiated admissions discounts would still be honored by Leesburg Animal Park, Mill Mountain Zoo, Virginia Living Museum, Luray Zoo etc. Mike Salotti indicated he had visited Luray Zoo and although they were unaware of the VHS discount, they still honored it. It was generally agreed that the institutions listed in membership benefits would all need to be contacted to determine if admission discounts still apply. Larry Mendoza volunteered to contact Luray Zoo and Matt Close volunteered to contact Mill Mountain Zoo. Jason Gibson agreed to approach Virginia Natural History Museum to see if a VHS discount could be negotiated. Erin Chapman agreed to contact the Virginia Living Museum and some of the others. Dave Perry mentioned the membership only surveys should be listed as a membership benefit. The Conservation Committee has held membership only surveys for several years where VHS members were also permitted to invite one guest. He also suggested a similar approach should be used for some of the other VHS surveys. Mike Salotti mentioned that the Sunday portion of the annual Spring survey is a membership only event. Larry Mendoza suggested it was a benefit to be a member of an organization dedicated to conservation, education and research for native Virginia amphibians and reptiles.

Erin Chapman raised the topic of using data from iNaturalist or Herp Mapper for VHS vouchers for county records. She has identified about 30 iNaturalist observations that would be county records and is convinced that the observers are qualified. She has attempted to get them to submit a voucher consistent with VHS standards but has been unable to do so, which is frustrating. She suggested Herp-Mapper might be an alternative. Although Herp-Mapper does not generally disclose locality or GPS coordinates, there is a consent form for research that VHS might be able to use to obtain locality. Paul Sattler is not familiar with Herp-Mapper but explained why iNaturalist records cannot be used for VHS vouchers. Copyright permission is needed from the observer but more important the data point location for sensitive species are not accurate. Sometimes the location difference is substantial. This makes it impossible to know if the iNaturalist locality information is accurate. Jason Gibson suggested that Erin continue to try to convince her iNaturalist contacts to provide written field notes per VHS voucher standards. Perhaps it would help to remind them that their data will be lost if National Geographic decides not to fund iNaturalist.

Other Business

a. Liability Insurance

Dave Perry raised the not so new topic of liability insurance. Larry Mendoza discussed the cost of insurance issue with Reptile Educators of Virginia at the 2020 Virginia Living Museum exhibition. He could not remember the exact figure but thought their cost was low, either $300-400 per year or per event. During the discussion it was suggested VHS had two potential sources of

liability, live animal tabling events and field surveys. Of the two types Larry suggested VHS had far more liability risk with the field surveys including snake bite, bee stings and personal injury. However, Larry also noted over several decades of VHS field surveys there had not been any incidents but also noted it would only take one injury to cause major problems. Matt Close said in his previous efforts to get a quote for insurance the difficulty was finding an underwriter. One question he received regarded the amount we are willing to spend. Matt suggested what would be concerning is an accident or a venomous snake bite to a person without health insurance or with inadequate coverage. Treatment for a copperhead bite could run as high as $100k. It is unclear whether one insurance company would be prepared to cover both risk categories. Perhaps two separate policies would be needed. Matt Close tried to get an idea of how much VHS might be willing to pay for liability insurance. Suggestions varied. A lengthy discussion followed concerning revenues, expenditures, the projected costs of core functions and the need for a budget. The thinking is that in any given year, VHS should only consider using remaining unspent operating funds to pay for insurance. Larry indicated if we could not get or afford liability insurance, we may decide to discontinue some activities or just accept the risk. For some tabling and education events with live animals, there are exhibitor liability insurance requirements. VHS will need to skip exhibiting live animals at these events until the insurance issue is resolved. Larry will email the information and form he received in the past from Francis Dean & Associates to Matt Close who will follow-up to obtain some insurance options clarity.

b. Minority Inclusion

Erin Chapman has been working on a proposed message of diversity and inclusion for VHS Ex-Com consideration. She had a version she likes but was unable to reconstruct it at the meeting. Erin agreed to email a statement proposal to the Ex-Com on Monday June 8 for discussion. There was a general discussion about what VHS could do to make our organization and outdoor activities more inclusive including creating outreach programs for minority and dis-advantaged communities. Larry Mendoza believes VHS has a responsibility to recruit and develop minority membership and leadership within our organization. He pointed to the VDGIF Wildlife Viewing Planning Committee, which includes a leader from black minority community and a diversity leader and has pro-active plans to go out to inner cities and partner with them to develop outdoor wildlife activities and involvement. Larry also mentioned that he turned a nervous initial interaction into a very enthusiastic appreciation for snakes in a live presentation he made to Hampton College, which primarily enrolls black students. Larry cited this as an example of what can be accomplished within minority communities. Bonnie Keller indicated she experienced similar interactions with minority students in her classrooms. Nell Konecnzy suggested VHS should try to identify black herpetologists in Virginia, who might want to be active in VHS. Larry plans to actively outreach to minority and disabled communities and Travis Anthony agreed to support him within the Richmond vicinity. Larry will recommend and support a VHS statement in support of the Black Lives movement and inclusion.

There being no other business to discuss, Travis Anthony adjourned the meeting at approximately 20:37 h.

Dave Perry
VHS Secretary

Virginia Herpetological Society
Treasurer's Report Draft
June 7, 2020

Previous Balance– November 21, 2019, Gross	$	16,657.75
Savings C.D.	$	6,096.37
Unencumbered	$	10, 561.38
Net Receipts (excludes PayPal Fees)		
Dues	$	3787.00
Donations	$	565.00
Amazon Smile	$	172.15
Expenses		
Permits	$	50.00
Domain Renewal	$	28.16
Tabling and Promotional Supplies & Materials	$	418.00
Educational Events	$	503.54
Grants	$	500.00
Postage	$	67.02
Paypal Fees	$	152.21
Current Gross Balance	$	19,462.97
Grant Checks Outstanding	$	500.00
Savings C.D.	$	6,096.37
Current Available Balance (unencumbered)	$	12, 866.60

VHS Memberships (dues current)

Regular:	255
Student:	12
Lifetime:	71
Total	**338**

Matthew Close
VHS Treasurer

Field Notes

The Field Notes section of *Catesbeiana* provides a means for publishing natural history information on Virginia's amphibians and reptiles that does not lend itself to full-length articles. Observations on geographic distribution, ecology, reproduction, phenology, behavior, and other topics are welcomed. Field Notes will usually concern a single species. The format of the reports is: scientific name (followed by common name in parentheses), state abbreviation (VA), county and location, date(s) of observation, observer(s), data and observations. The name(s) and address(es) of the author(s) should appear one line below the report. Consult the editor if your information does not readily fit this format. **All Field Notes must include a brief statement explaining the significance of the record** (e.g., new county record) **or observation** (e.g., unusual or rarely observed behavior, extremely early or late seasonal record, abnormal coloration, etc.). Submissions that fail to include this information are subject to rejection. Relevant literature should be cited in the body of the text (see Field Notes in this issue for proper format). All submissions will be reviewed by the editor (and one other person if deemed necessary) and revised as needed pending consultation with the author(s).

If the Field Notecontains information on a **new county (or state) record**, **verification is required in the form of a voucher specimen** deposited in a permanent museum (e.g., Virginia Museum of Natural History) or a **photograph** (print, slide, or digital image) **or recording** (cassette tape or digital recording of anuran calls) deposited in the archives of the Virginia Herpetological Society. Photographs and recordings should be sent to the editor for verification and archiving purposes; the identity of voucher specimens must be confirmed by a museum curator or other qualified person. Include the specimen number if it has been catalogued. Prospective authors of distribution reports should consult Mitchell and Reay (1999. *Atlas of Amphibians and Reptiles in Virginia*), Mitchell (1994. *The Reptiles of Virginia*), and Tobey (1985. *Virginia's Amphibians and Reptiles: A Distributional Survey*) [**both atlases are available on-line on the VHS website**] as well as other recent literature to determine if they may have a new county record. New distribution records from large cities that formerly constituted counties (Chesapeake, Hampton, Newport News, Suffolk, and Virginia Beach) are acceptable, but records from smaller cities located within the boundaries of an adjoining county will only be published if the species has not been recorded from that county. Species identification for observational records (e.g., behavior) should be verified by a second person whenever possible.

PHOTOGRAPHS

High contrast photographs (prints, slides, or digital images) of amphibians and reptiles will be considered for publication if they are of good quality and are relevant to an accompanying article or field note. Digital images are preferred. Prints should be on glossy paper and no larger than 5 x 7 inches. Published photographs will be deposited in the Virginia Herpetological Society archives.

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